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PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119
PARESCL/0298Dee/EJK7-80

9 February 1998

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Status of Lagoon No. 1 Reconstruction Project

Dear Mr. Houseknecht:

In accordance with our discussions earlier today (i.e., 9 February 1998), I can confirm that the Lagoon No. 1 reconstruction project at Canton Drop Forge, Inc. is substantially complete. Successful start-up of the reconstructed Lagoon No. 1 and pumping system was achieved on 8 January 1998. Other than a few punch-list items, which remain to be completed with respect to the pumping system and finish-grading of the general lagoon area, and a presumably minor investigative and repair action required for the pond lining, the work is essentially complete.

If additional details are required concerning the status of this project, please contact me at (216) 486-9005.

Very truly yours,

PARSONS ENGINEERING SCIENCE, INC.

Ed Karkalik

Edward J. Karkalik, PE

EJK/dee
cc: Mr. Sam Saad
File 73139703000

PARSONS

2(b)

PROCTOR   DAVE, STAN, ED, KOTTT
150 APPROX FROM CORL   12/11/97
CHECK VALVE LUBE PM ?
STANS INVOICE
LET STAN KNOW IF NOT HOME THEN
CHECK ON P.O. TO BOMAN
NEED 5 DAYS TO COMPLETE (3 DAYS GRADING)
23 or 24TH
23RD 1:30 MEET
12/15
NO VAULT FOR PUMP
S.W. CORNER IS LOW POINT : PUMP WILL NOT FLOOD
SIDEWALL IS NOW DRYING

psi Environmental Geotechnical Construction
Consulting • Engineering • Testing

2(b)

REPORT OF MOISTURE DENSITY RELATIONSHIP OF SOIL

TESTED FOR: BEAVER EXCAVATING
4650 SOUTHWAY ST SW
P O BOX 6059
CANTON, OH 44706

PROJECT: 1997 BEAVER EXCAVATING COMPANY
MISCELLANEOUS TESTING

DATE: November 26, 1997

OUR REPORT NO.: 145-70059-6

TEST DATA

Visual Classification BROWN SILTY CLAY WITH SAND & GRAVEL

Sample Source BEAVER YARD BORROW PIT, SAMPLE #1,
OBTAINED BY PSI ON 11/24/97

Method of Test ASTM D 698 (STANDARD)

Rammer: Manual Method of Preparation: Moist

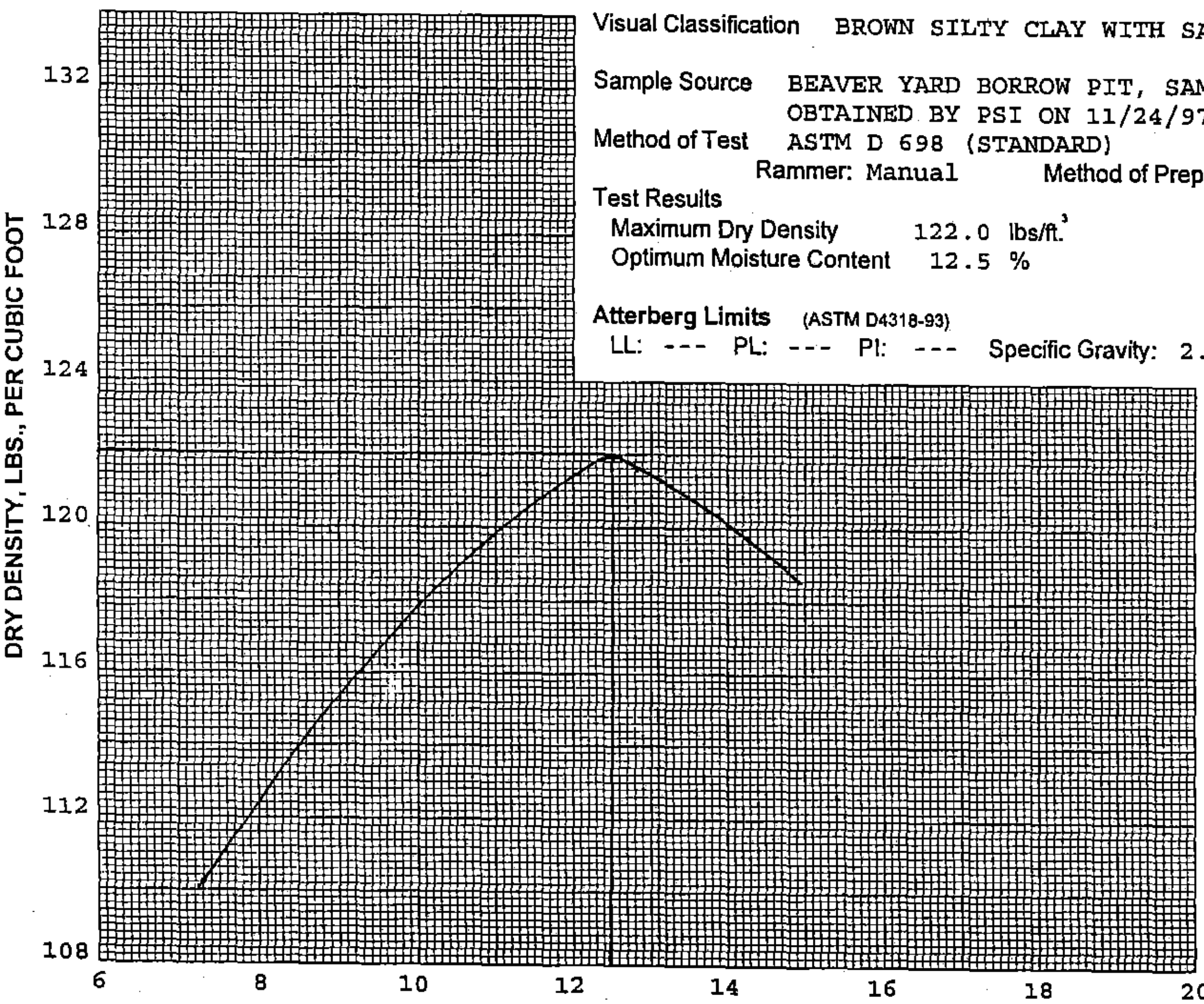
Test Results

Maximum Dry Density 122.0 lbs/ft.^{3}

Optimum Moisture Content 12.5 %

Atterberg Limits (ASTM D4318-93)

LL: --- PL: --- PI: --- Specific Gravity: 2.70 (estimate)



Grain Size Analysis
(ASTM C136-93 AND/OR C117-90)

Sieve Size	Percent Passing

REMARKS:

Respectfully submitted,
Professional Service Industries, Inc.

cc: 2C: BEAVER EXCAVATING COMPANY

CDF006707

Environmental Geotechnical Construction
Consulting • Engineering • Testing

REPORT OF MOISTURE DENSITY RELATIONSHIP OF SOIL

TESTED FOR: BEAVER EXCAVATING
4650 SOUTHWAY ST SW
P O BOX 6059
CANTON, OH 44706

PROJECT: 1997 BEAVER EXCAVATING COMPANY MISCELLANEOUS TESTING

DATE: November 26, 1997

OUR REPORT NO.: 145-70059-7

TEST DATA

Visual Classification BROWN SILTY CLAY WITH GRAVEL

Sample Source BEAVER YARD BORROW PIT, SAMPLE #2 OBTAINED BY PSI ON 11/24/97

Method of Test ASTM D 698 (STANDARD)

Rammer: Manual Method of Preparation: Moist

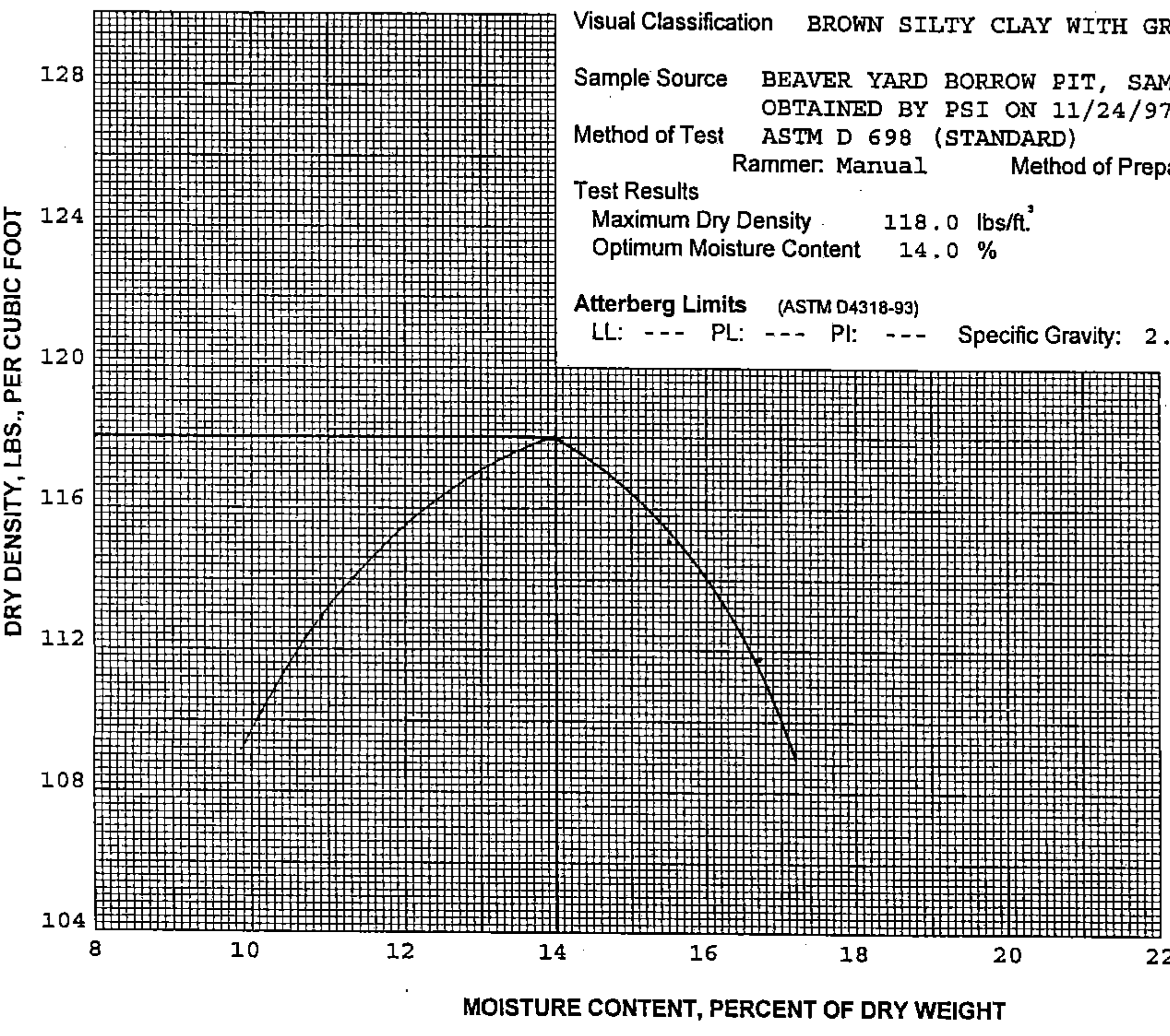
Test Results

Maximum Dry Density 118.0 lbs/ft.³

Optimum Moisture Content 14.0 %

Atterberg Limits (ASTM D4318-93)

LL: --- PL: --- PI: --- Specific Gravity: 2.70 (estimate)



Grain Size Analysis
(ASTM C136-93 AND/OR C117-90)

Sieve Size	Percent Passing

REMARKS:

Respectfully submitted,
Professional Service Industries, Inc.

cc: 2C: BEAVER EXCAVATING COMPANY

CDF006708

2(b)

PARSONS ENGINEERING SCIENCE, INC.

A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC.
19101 Villaview Rd.
Cleveland, Ohio 44119
(216) 486-9005
Fax: (216) 486-6119

LETTER OF TRANSMITTAL

DATE 12/12/97
JOB NO. 731397.03000
ATTENTION Keith Houseknecht
RE: --

TO
CANTON DROP FORGE, INC
4575 SOUTHWAY STREET, SW
CANTON, OH 44706

WE ARE SENDING YOU THE FOLLOWING ITEMS: ☑ Attached ☐ Under separate cover via ______ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of Letter ☐ Charge order ☐ ______

Dated ______

COPIES	DATE	NO.	DESCRIPTION
1	11/26/97	145-70059-6	PSI PROCTOR (STANDARD) RESULTS - #1
1	11/26/97	145-70059-7	PSI PROCTOR (STANDARD) RESULTS - #2

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ For checking ☐ Resubmit ______ copies for approval

☑ For your use ☐ Approved as submitted ☐ Design only, not for construction

☐ As required ☐ Approved as noted ☐ Return ______ corrected prints

☐ For review and comment ☐ Returned for corrections ☐ ______

☐ For your action

REMARKS: ______

COPY TO ______

SIGNED: Edward J. Kolasik

If enclosures are not as noted, please notify us at once.

PESI-COR/120694)

CDF006709

Comp TD 2(b) 3

PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC.

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119

PARESCL/1197/Dec/MWO2-6

12 November 1997

Post-it® Fax Note 7671	Date 11/12	# of pages ▸ 7
To Keith Houseknecht	From Ed Karkalik	
Co./Dept. CDF	Co. Parsons ES	
Phone #	Phone #	
Fax # 330-477-2046	Fax #	

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Completion of Lagoon No. 1

Beaver Appro $20,000

Dear Keith:

As we have discussed during the last few days, Canton Drop Forge, Inc. (CDF) has requested that Parsons Engineering Science, Inc. (Parsons ES) and The Beaver Excavating Company (Beaver) develop a plan for finishing Lagoon No. 1 during calendar year 1997, preferably by 15 December 1997, if practicable. This letter represents Parsons ES' understanding and commitment to provide the engineering support and construction observation services required to meet CDF's objective. Beaver is preparing a separate proposal letter for CDF's review and approval for the physical implementation of the Lagoon No. 1 completion.

PROJECT UNDERSTANDING

It is Parsons ES' understanding that CDF would like to finish the Lagoon No. 1 project before year-end 1997, and preferably by 15 December 1997, if practicable. To meet this objective, the following scope of work would be required to be completed:

1. complete all remaining scope items included in the original design for Lagoon No. 1, except as modified by previously agreed design change (i.e., location and position of pump) or described in the following items.
2. after finish placing, grading and compacting the bottom 12-inch clay layer over the remaining areas of the original Lagoon No. 1 surface, place and compact sufficient additional fill material in the Lagoon such that the final grade (after placement of the top, 6-inch clay layer) of the Lagoon maintains side slopes no steeper than 2.5:1 (i.e., 2.5 feet horizontally per 1 foot vertically; see attached sketch). Our rough calculations indicate that no more than about 1000 cubic yards (cu yd.) of additional fill material will be required to achieve the desired slopes. Of this volume, an estimated 500 cu yd. may be obtained from the surface of the bio-cell area; a cursory inspection of the bio-cell indicates that this volume of impacted and stabilized soil remains in the area. The remaining 500 cu yd. would be borrowed from a near-by source of clean fill material. — SOUTH SIDE OF SOUTHWAY ST.
3. prior to accepting any fill material from the proposed source, conduct a RCRA characterization (e.g., TCLP) analysis and soil stability (e.g., CBR) test to verify the suitability of the borrow material with respect to environmental and geotechnical considerations. — IN PROCESS & PUMPING IN PROGRESS
4. after completing the placement of fill material to achieve the desired grades, install the top clay layer, finish the discharge piping and pump system (in accordance with the agreed design revisions), and install erosion protection (e.g., rip rap) at each of the five influent pipe locations.
5. finish grade the top bank (on the East side of the Lagoon) and install a sewer line to provide a means to collect and convey the surface water, which accumulates in this area during a storm event, to a depressed area and then into Lagoon No. 1. — ADDER?

+ CATCH BASIN NORTH ... — BOTH ADDERS

PARSONS

6. resolve variable quantity issues, if any, with Beaver and recommend final payment amounts to CDF for compensation to Beaver for the project.
7. finalize paperwork for the project from an Ohio EPA Voluntary Action Program (VAP) perspective, ensuring that the project file is complete (according to current VAP requirements) for a future VAP closure of Lagoon No. 1, should CDF choose to pursue same.

TIME LIMIT FOR DECISION?

PROPOSED SCOPE OF SERVICES

To achieve CDF's objective and complete the steps outlined above, Parsons ES proposes to provide to CDF the following engineering support and construction observation services. The estimates provided in the budget below are based on (1) a four-week construction period, (2) the general sequence of events proposed by Beaver in implementing this incremental scope of work and (3) an assumption that the project can be completed without disruption due to potentially adverse weather conditions (see notes in the Budget and Schedule section below).

Parsons ES' scope of services comprises these three tasks:

Task 1 - Planning, Design and Contracting Support

In this Task, Parsons ES will plan the final stages of this project, especially taking into account the weather conditions likely to be encountered during the planned construction period. Additional design details and specifications required for the implementation of the proposed scope of work, if any, will be provided. Also, contracting support services, as required for the execution of this phase of the work, will be provided in this task.

With respect to design details, Parsons ES will work with Beaver to develop projected contours and profiles, required for implementing the planned, final 2.5:1 slope of the top clay layer. From this information, Parsons ES and Beaver will refine our estimates of the quantities of clay, stabilized soil and borrow material required to achieve the desired final slopes. As a result, a more accurate cost estimate will be developed and provided to CDF. This estimate will then be used for defining the cost basis for completing the Lagoon No. 1 project. Parsons ES will review the terms and conditions of CDF's existing contract with Beaver for performance of the incremental work and advise CDF of changes, if any, which should be considered in light of the expanded scope and impending weather conditions (especially with regard to liquidated damages, performance bonus, etc.).

After implementation of the planned activities described or referenced above, Parsons ES will review the work completed by Beaver for compliance with the scope and specifications. Our review will form the basis for CDF's response to claims for adjustment to contract values (i.e., based on variations in volumes of materials which were moved, stabilized, placed, compacted, borrowed, etc.) made (or expected to be) by Beaver.

Task 2 - Construction Observation

In this Task, Parsons ES will provide an experienced construction observer to monitor progress of the contractor during the critical stages of completing Lagoon No. 1. This aspect of our proposed scope of services is vital to the successful completion of this project, primarily due to the impending weather conditions (e.g., freezing temperatures, periods of heavy precipitation, etc.). Parsons ES will monitor Beaver's adherence to the project specifications, scope and schedule during these most significant activities:

1. **compacting the lower clay layer** to provide good compressive strength and appropriate moisture levels for the weather conditions encountered;
2. **removing, consolidating and stabilizing (as necessary) any oil-impacted soil** remaining in the bio-cell area;
3. **compacting and placing the stabilized soil and additional borrow material** (from a TCLP-tested source area) in the bottom of the Lagoon, such that good compressive strength and appropriate slopes are maintained;
4. **compacting and placing the final clay layer** to provide good compressive strength and appropriate slopes and moisture content; and
5. **tying in and starting up the discharge pump and transfer line** in accordance with the final design for these facilities.

Based on Beaver's proposed work plan, we anticipate the requirement for about seven (7) work-days, distributed over the next four-week period, to complete these tasks. As a result, we are proposing that this activity be completed on a part-time level-of-effort (LOE) basis, estimated for the sake of this proposal, at 40 hours of on-site observation. If full-time construction observation is required, as dictated by adverse weather conditions and consequent difficulties encountered during construction, the LOE will be increased to at least 56 hours on-site. Also, if changed conditions are encountered and the construction period becomes modified as a result, Parsons ES will advise you of the need to revise these LOE estimates.

Task 3 - Project Closure (for VAP File)

ADDED COST

Prior to closing this project technically and financially, Parsons ES proposes that steps be undertaken to ensure the completeness of the project files for a possible VAP closure, if CDF should desire to pursue same in the future. In particular, our Certified Professional (CP) will review and certify, as appropriate, the record files for completeness and appropriateness in accordance with the currently understood VAP requirements. If VAP regulations change in the future (i.e., but before CDF initiates a "formal" VAP closure for Lagoon No. 1), the file may require updating and/or revision. A review of protocols and procedures followed, affidavits received and completeness of the project documentation would be undertaken. Deficiencies, if any are found, would be identified. Correction of any deficiencies, either (1) by the CP, if within his authority and control to do so; or (2) by other parties within whose authority and responsibility for addressing the identified issues resides, is beyond the scope of this proposal and could be estimated only after the review was completed. Please note that a certification of completeness is only one (of several) step(s) required for developing a No Further Action (NFA) letter under VAP guidance. Obtaining an NFA, if desired by CDF for this project, is also beyond the scope of this proposal.

BUDGET AND SCHEDULE

Parsons ES proposes to complete the tasks described above, within the projected schedule, on a "time and expenses, total not-to-exceed" basis. The total cost projected for Parsons ES' effort is $5,990; as usual, Parsons ES reserves the right to modify this budget estimate if changed conditions and schedule delays are encountered. In particular (as pointed out in the Task 2 description above), if difficult conditions requiring full-time attention and observation are encountered during construction, an expansion of the budget will be required. The resulting impact could increase the project budget by as much as $1,509, to a new total of $7,499. Table 1 provides a detailed break-down of the base budget.

Assuming that CDF's authorization to proceed is received by 15 November 1997 and that acceptable weather conditions are experienced between 15 November 1997 and 15 December 1997 (i.e., providing at least seven normal working days with acceptable working conditions), we anticipate that the planned scope of work can be completed prior to year-end 1997. **NOTE:** If an extended period of sub-freezing temperatures or excessive amounts of precipitation is encountered, Parsons ES will recommend that work be stopped and that completion of the project be delayed until Spring 1998. It is highly inadvisable to attempt the continued placement and compacting of clay during periods of heavy precipitation or frost.

TERMS AND CONDITIONS

The terms and conditions for the proposed work will be identical to those incorporated in our original proposal, dated 13 June 1997, and by reference in the Engineering Services Agreement subsequently executed by CDF and Parsons ES. Similarly, it is understood, except as modified as a result of Task 1 activities (see above), that the terms and conditions comprising CDF's original contract with Beaver, dated 21 August 1997, will prevail for the completion of the proposed expansion of construction activities.

Parsons ES appreciates this opportunity to continue to provide environmental project and construction observation services to Canton Drop Forge. If you would like further clarification of any points contained in this proposal, please contact Edward Karkalik by telephone at (216) 486-9005 or by e-mail at Edward_Karkalik@parsons.com.

Most sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Wilson H. Rownd, PE
Vice President/Manager

Edward J. Karkalik, PE
Project Manager

WHR/EJK/dee
cc: CMB (File 73139703000)
Mr. Sam Saad
Mr. Alan Resnik, CP

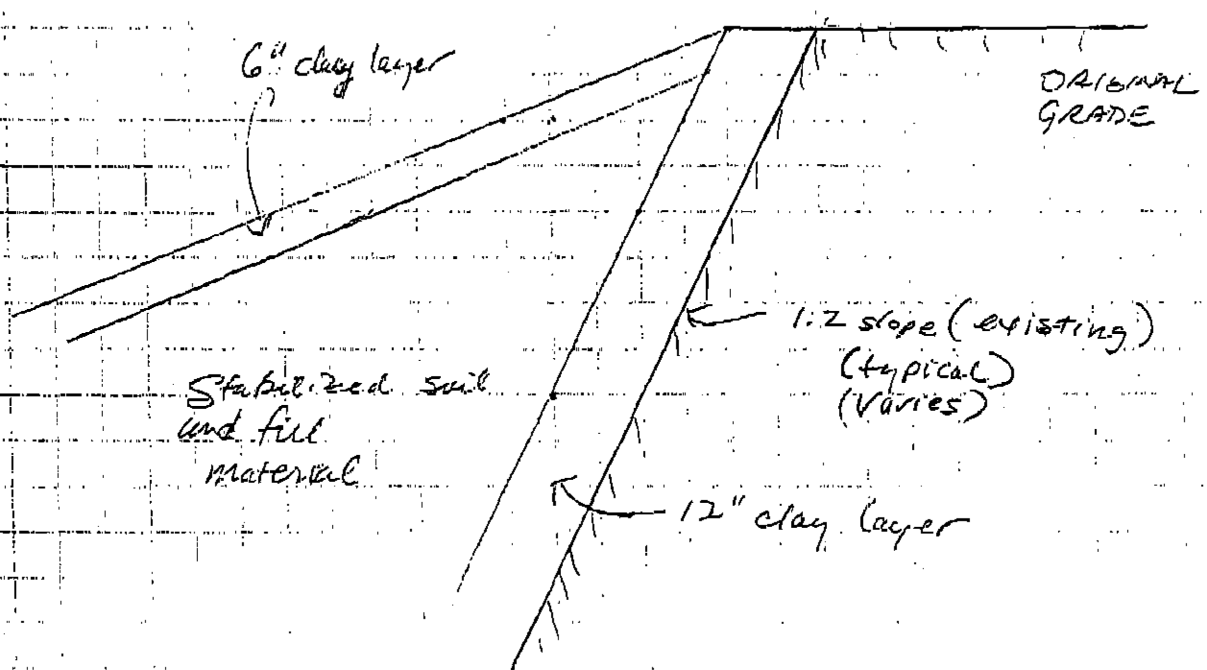
PARSONS ENGINEERING SCIENCE, INC.

Client: CANTON DROP FORGE, INC.
Subject: LAGOON NO. 1 SLOPES

	By	Date
Prepared		11/10/97
Checked		
Reviewed		
Approved		

Job No. 731397.03000
Group No.
Page No.
Sheet 1 of 1
Rev. No.

TOP OF BANK DETAIL



11/12/97 WED 15:32 FAX 216 486 6119 PARSONS ES CLEVELAND 008

FIGURE 1

CANTON DROP FORGE, INC.
LAGOON NO. 1 COMPLETION

PROJECT COST ESTIMATE

CSTESTOI

TASK DESCRIPTION	Billing Title / Category / Rate	PROJ MGR EJK	SENIOR ENGR EJM	PROJ ENGR DAK	TECH DIR GJM	FIELD ENGR SSS	CERT PROF AJR	ADMIN SUPV CMB	ADMIN SUPP DB	WORD PROC DAC	Total Hours / Total Cost	ODCs	Total Task Cost
		LABOR										ODCs	TOTAL
	Rate	$112	$80	$55	$112	$51	$80	$82	$28	$45			
1 Planning, Design and Contracting Support	hours	10	2	5	1			0.5		1	19.5		
	$	$1,124	$160	$275	$112	$0	$0	$41	$0	$45	$1,757	$202	$1,959
2 Construction Observation (1)(2)	hours	10			1	30			0.5		41.5		
	$	$1,124	$0	$0	$112	$1,520	$0	$0	$14	$0	$2,771	$462	$3,233
3 Project Closure (for VAP File)	hours	2					4		0.5	1	7.5		
	$	$225	$0	$0	$0	$0	$321	$0	$14	$45	$604	$193	$797
	hours										0		
	$	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	hours										0		
	$	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	hours										0		
	$	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	hours										0		
	$	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	hours										0		
	$	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Units	Hours	22	2	5	2	30	4	0.5	1	2	68.5	PROJECT Total=	
Total Costs (2)	Cost	$2,474	$160	$275	$225	$1,520	$321	$41	$28	$89	$5,133	$857	$5,990

NOTES:

(1) Assumes a four-week construction duration, in which there are seven productive work-days. If schedule delays are encountered or additional work-days are required, this LOE estimate may increase.

(2) Costs for full-time construction observation, if required, could add $1,509 to the project budget, bringing the Total Costs to $7,499.

CDF006715

CANTON DROP FORGE, INC.
LAGOON NO. 1 COMPLETION

PROJECT COST ESTIMATE

CSTEST01

	ODCs								
	COMMUNICATIONS				TRAVEL	COMPUTER		PRINTING	
	Teleph ($)	FAX ($)	Fed Ex ($)	Postage ($)	Mileage (mi.)	General (hr)	WP (hr)	Copier (ea)	Blue Prints (ea)
TASK DESCRIPTION	1	1	1	1	0.31	10	10	0.10	1
1 Planning, Design and Contracting Support	15	10	10	10	150	6	2	200	10
	$15	$10	$10	$10	$47	$60	$20	$20	$10
2 Construction Observation (1)(2)	50	20			1200	2			
	$50	$20	$0	$0	$372	$20	$0	$0	$0
3 Project Closure (for VAP File)		10	20	3		4	1	1000	10
	$0	$10	$20	$3	$0	$40	$10	$100	$10
	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Units	65	40	30	13	1350	12	3	1200	20
Total Costs (2)	$65	$40	$30	$13	$419	$120	$30	$120	$20

NOTES:

(1) Assumes a four-week construction duration, in which there are seven productive work-days. If schedule delays are encountered or additional work-days are required, this LOE estimate may increase.

(2) Costs for full-time construction observation, if required, could add $1,509 to the project budge bringing the Total Costs to $7,499.

ENVIRONMENTAL AND ECONOMIC IMPACTS OF SEWER CONSTRUCTION PROJECT IN NORTHEAST OHIO

Recently, during sewer construction in a small community located in Northeast Ohio, evidence of a pre-existing contamination issue started an investigative and remedial exercise which has now out-lasted the sewer project by several years. The property owner's obligations are continuing to mount with no end in immediate sight. The referenced sewer in this case was being installed by the municipality in a location at least several hundred feet distant from our client's property and potential source area. The subsurface conditions were characterized as primarily highly conductive (i.e., of groundwater) sands and gravel with the potential capability of producing between 100 and 500 gallons per minute from properly installed groundwater wells. Groundwater elevations in the area were approximately three feet below grade. To affect groundwater levels sufficiently such that sewer construction could proceed uninterrupted, de-watering was designed and implemented to lower groundwater levels to at least 20 feet below grade(e.g., the excavation for sewer construction was about 10 feet deep).

During routine excavation activities, hydrocarbon sheens and odors were detected in the trench and subsequently in water recovered and pumped (i.e., groundwater de-watering) from the excavation. The general contractor immediately contacted the OEPA Division of Emergency and Remedial Response (DERR), as required by State regulation. OEPA DERR did a quick survey of the surrounding properties and identified our client's facility located just up-gradient from the area of sewer installation. Our client was now hooked and was required to complete and pay for all of the following.

- 7 of 30 de-watering points (which had been previously installed for the sewer construction project) were sampled and analyzed for hydrocarbon compounds. Rush analyses of the groundwater samples collected from the de-watering locations indicated concentrations of hydrocarbon compounds above de-watering discharge limits (NPDES limits had been set at less than 5 ppb for each individual compound).

  [Please note that the OEPA DERR required that our client check the de-watering locations, not the discharge. This is significant. On behalf of our client, we were required to treat the water from the impacted wells and not the discharge point (i.e., into the trench), which would likely have had lower concentrations of hydrocarbon compounds (due to dilution).]

- Under the direction of OEPA DERR and on behalf of our client, Parsons ES was required to retrofit and re-pipe the impacted wells (eventually a total of at least 6) to a treatment system (consisting of three 10,000-pound canisters of activated carbon) because de-watering had to continue (to allow completion of sewer construction in a timely manner). Throughout the construction period, Parsons ES pumped over 40 MILLION gallons of water through the activated carbon treatment system.

- In conjunction with de-watering, OEPA DERR required that our client define rate and extent of impacts. This resulted in the installation and sampling and analysis of groundwater from at least 45 monitoring wells. OEPA DERR required that soil and groundwater samples be collected and analyzed from each location, with a "rush" turn-around time identified for analyses.

- After the horizontal and vertical extent of hydrocarbon impact had been defined and after de-watering (for sewer construction) was concluded, Parsons ES was required to prepare a Remedial Action Plan (RAP) for the site on behalf of our client. We are currently implementing the RAP, which includes:

    1. soil vapor extraction (SVE), followed by vapor destruction (the average flow from the 13 SVE locations is about 600 SCFM),
    2. air sparging (10 sparging points), and
    3. groundwater recovery (average monthly flow 400,000 gallons from 6 wells) from the source area to reduce hydrocarbon loading (i.e., via leaching) to the groundwater system.

The clean-up criteria must yet be negotiated with OEPA. Application of VAP rules may be possible, but is as-of-yet, uncertain. If use of VAP guidance is not approved, application of the more stringent Solid Waste or BUSTR rules may be required.

The following is a rough estimate of work items and total cost projected for this project:

- Emergency de-watering, OM&M, treatment, sampling, analysis and reporting (4 to 5 months' worth of work for at least one person).

- Site assessment activities, sampling, analysis and reporting of 45 monitoring wells (at least a month's worth of time -or more - for at least one person).

- Development of the RAP and negotiations with OEPA DERR (at least one month's worth of work for at least one person).

- Remedial system installation, contractor costs, equipment costs, and permitting (one month's worth of work for at least two people).

- Continued OM&M of system, sampling, analysis and reporting (this is our second year at $50,000 per year).

A rough guess of what it has (and will ultimately) cost our client is between $750,000 and $1,000,000. This amount could have easily been doubled, if OEPA had taken control of the site and managed the remediation. After completion, OEPA would then seek re-imbursement from any identified responsible parties.

PARSONS ENGINEERING SCIENCE, INC.

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

DATE: 12/1/97

TO: Mr. Keith Houseknecht

LOCATION: Canton Drop Forge, Inc.

RAPIDFAX NO.: (330) 477-2046

COPIES TO:

FROM: Ed Karkalik

TOTAL NUMBER OF PAGES 3 (including this cover letter)

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL BACK AS SOON AS POSSIBLE.

We are herewith transmitting the following:

DATE	NO.	DESCRIPTION
12/1/97		Environmental and Economic Impacts of Sewer
		Construction Project in Northeast Ohio

Dear Keith -

As we have previously discussed, attached is a brief write-up of a project with circumstances similar to those which CDF may be facing if (and when) ODOT proceeds with sewer construction along the southeast corner of your property.

Rich Volpi (who did the Lagoon No. 2 sampling and is familiar with the hydrogeology at your site, based on the previous RFR work) is the project hydrogeologist for the site referred to in the attachment and will be happy to discuss this (referenced) project and "lessons to be learned" for CDF with you and/or Jerry as appropriate.

Regards,

Ed

JOB NO. 731397.03000

02000C02

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3

PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road. Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119
PARESCL/1197/Dee/EJK7-69

20 November 1997

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Proposal to Provide Ad Hoc Engineering Services to Canton Drop Forge, Inc.

Dear Keith:

In response to your request regarding the establishment of a retainer for engineering services, Parsons Engineering Science, Inc. (Parsons ES) is pleased to offer Canton Drop Forge, Inc. (CDF) this proposal. The primary objective of this proposal is to establish a mechanism by which CDF may obtain environmental engineering services and related technical support in the most time-efficient, least cost, and most easily administered manner. Unlike a "conventional" retainer, however, CDF is not obligated by accepting this proposed arrangement to pay Parsons ES any fees until, and unless, our services are specifically required and subsequently rendered.

By way of this proposal and the attached Engineering Services Agreement (ESA), Parsons ES commits to provide to CDF the available resources required, upon demand, at the specified rates and within the defined terms and conditions. Once in place, implementation of the ESA would be very straight-forward.

The scope of services provided under this arrangement is envisaged to typically involve a few hours of effort. If a substantial effort (say, more than 10 hours) is required, a separate, task-specific arrangement would be established. The proposed agreement is not intended to address scope changes for current or previously authorized project efforts (i.e., completion of Lagoon No. 1 re-construction).

As a need for services is identified, CDF's representative (presumably you, but anyone designated by CDF could initiate a request for services) would contact Parsons ES' representative (nominally, Ed Karkalik). The requirement for services, or "task", would be defined (i.e., described) by CDF, an identification of the people and an estimate of the time required would be made by Parsons ES and agreed by both parties. For accounting and auditing purposes, both CDF and Parsons ES would log the task and corresponding estimate in their respective journals. The mutually agreed entries in the journal would then provide the basis for

- authorization and completion of the tasks and subsequent billing (by Parsons ES); and
- authorization, monitoring the receipt of services and subsequent approval of invoices (by CDF).

A facsimile, confirming the details of each incremental task, would be generated by Parsons ES and forwarded to CDF to ensure mutual understanding. If there are any discrepancies between CDF's requirements and the details contained in the facsimile, CDF could advise Parsons ES to revise the task description or budget accordingly.

Post-it® Fax Note 7671	Date 11/20/97 # of pages ▸ 6
To Keith Houseknecht	From Ed Karkalik
Co./Dept. CDF	Co.
Phone # (330) 477-4511	Phone #
Fax # (330) 477-2046	Fax #

ORIGINAL WILL FOLLOW VIA MAIL!

PARSONS

The procedure, described in concept above, would provide a relatively simple mechanism for CDF to access the engineering services which are required from time to time, without the encumbrance of excessive paperwork and delays. A few, simple safeguards could be put in place to prevent confusion and unwanted support:

1. no work would start without authorization from the CDF representative;
2. Parsons ES would be required to inform CDF if the task previously approved required additional personnel or hours to complete prior to proceeding; and
3. closure (i.e., acceptance) by CDF would be required prior to a task being defined as complete.

Failure to follow these basic provisions, or those subsequently developed jointly by CDF and Parsons ES, as required to satisfy each entity's respective accounting and auditing procedures, would be arbitrated according to the terms in Appendix A (attached).

If this approach is acceptable, please arrange for the authorization of the attached ESA. We will then work with CDF to establish the procedures to implement the ESA. If CDF wishes to set a maximum cap for the ESA, please suggest a level with which you will be comfortable for the period of this agreement. Nominally an amount of about $5,000 should be sufficient for the four-month "trial" period proposed. This represents about two hours per week (or ten hours per month) of technical support.

Parsons ES appreciates the opportunity to be considered for this important function. As always, we look forward to continuing to provide engineering services to Canton Drop Forge. If you would like further information or clarification regarding any points in this proposal, please feel free to contact either of us at (216) 486-9005.

Most sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Wilson H. Rownd, PE
Vice President/Manager

Edward J. Karkalik, PE
Project Manager

WHR/EJK/dee
cc: CMB (File 87004607403)

PARSONS ENGINEERING SCIENCE COMPANIES

2(b)
3

ENGINEERING SERVICES AGREEMENT

PARSONS ES: Parsons Engineering Science, Inc.
19101 Villaview Road, Suite 301
Cleveland, OH 44119

AGREEMENT NO.

CLIENT'S ID. NO.

CLIENT: Canton Drop Forge, Inc
4575 Southway Street, SW
Canton, OH 44706

EFFECTIVE DATE	COMPLETION DATE	PARSONS ES' CONTACT	CLIENT'S CONTACT
1 December 1997	31 March 1998	Edward J. Karkalik ( ) 216-486-9005	Keith Houseknecht ( ) 330-477-4511

COMPENSATION

- ☐ STANDARD RATE SCHEDULE
- ☐ (Attachment A)
- ☐ PAYMENT SHALL NOT EXCEED $
- UNLESS AUTHORIZED IN WRITING BY CLIENT
- ☐ OTHER (as indicated below)
- ☐ LUMP SUM $
- ☒ INVOICE MONTHLY (INSTRUCTIONS BELOW)

ITEM	DESCRIPTION OF SERVICES/SPECIAL PROVISION
01	Parsons ES will provide engineering services to Canton Drop Forge, Inc. (CDF) as required, during this Agreement period in accordance with the Terms and Conditions indicated on the reverse and in Appendix A, Supplemental Terms and Conditions. Services will be provided, on an as-needed basis, with labor billed at direct labor rates times a multiplie of 2.80 and Other Direct Costs (ODCs) billed at cost plus 7%. Direct labor rates, subject to change at the end of this Contract period, are idicated for key technical resources on Appendix B.

PARSONS ES

Date 11.20.97

Wilson H. Rownd, P.E.
Vice President/Manager
PARSONS ENGINEERING SCIENCE, INC.
19101 Villaview Road, Suite 301
Cleveland, OH 44119

CLIENT CANTON DROP FORGE, INC.

Date

J.P. Bressanelli
President

THE STANDARD TERMS AND CONDITIONS CONTAINED ON THE REVERSE SIDE HEREOF ARE APPLICABLE TO THIS AGREEMENT

PARSONS

REV 10/96

PARSONS ES ACCOUNTING

STANDARD TERMS AND CONDITIONS

1. INTERPRETATION

This AGREEMENT, consisting of these standard terms and conditions and the terms/instructions typed on the face of this AGREEMENT together with the Exhibits attached hereto, and all documents, drawings, specifications and instruments specifically referred to herein and made a part hereof shall constitute the entire AGREEMENT between the parties, and no other proposals, conversations, bids, memoranda, or other matter shall vary, alter, or interpret the terms hereof. The captions on this AGREEMENT are for the convenience of the parties in identification of the several provisions and shall not constitute a part of this AGREEMENT nor be considered interpretative thereof.

Failure of either party to exercise any option, right or privilege under this AGREEMENT or to demand compliance as to any obligation or covenant of the other party shall not constitute a waiver of any such right, privilege or option, or of the performance thereof, unless waiver is expressly required in such event or is evidenced by a properly executed instrument.

2. SEVERABILITY

It is understood and agreed by the parties hereto that if any part, term, or provision with this AGREEMENT is held illegal or in conflict with any law of the State where made or having jurisdiction over any of the parties hereto, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the AGREEMENT did not contain the particular part, term, or provisions held to be invalid, unless the effect thereof would materially change the economic burden of or benefit to either party.

3. GOVERNING LAW

This AGREEMENT and the Attachments hereto shall be governed by and construed in accordance with the laws of the State in which the work is performed.

4. INDEPENDENT CONTRACTOR

In the performance of the services under this AGREEMENT, PARSONS ES shall be an independent contractor, maintaining complete control of PARSONS ES' personnel and operations. As such, PARSONS ES shall pay all salaries, wages, expenses, social security taxes, federal and state unemployment taxes and any similar taxes relating to the performance of this AGREEMENT. PARSONS ES, its employees and agents shall in no way be regarded nor shall they act as agents or employees of the CLIENT.

5. CHANGES

The CLIENT, through its authorized representative, without invalidating this AGREEMENT, may order changes within the general scope of the services required by this Agreement by altering, adding to and/or deducting from the services to be performed. If any changes under this clause causes an increase or decrease in PARSONS ES' cost of, or the time required for, the performance of any part of the work under this AGREEMENT, an equitable adjustment shall be made by mutual agreement and the AGREEMENT modified in writing accordingly. All such changes in the Services shall be in writing and shall be performed subject to the provisions of this AGREEMENT.

6. STOP WORK ORDER

CLIENT may at any time, by written notice to PARSONS ES, require PARSONS ES to stop all or any part of the work called for by this order for a period of up to ninety (90) days after the notice is delivered to PARSONS ES ("Stop Work Order"). Upon receipt of the Stop Work Order, PARSONS ES shall forthwith comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Within a period of ninety (90) days after a Stop Work Order is delivered to PARSONS ES, or within any extension of that period to which the parties have agreed, CLIENT shall either cancel the Stop Work Order, or terminate the work covered by this order as provided in the "Termination" paragraphs of this AGREEMENT. PARSONS ES shall resume work upon cancellation or expiration of any Stop Work Order. An equitable adjustment shall be made in the delivery schedule or prices hereunder, or both, and this AGREEMENT shall be modified in writing accordingly, if the Stop Work Order results in an increase in the time required for the performance of this order or in PARSONS ES' costs properly allocable thereto. PARSONS ES may stop work, at its sole option if CLIENT fails to make payment of PARSONS ES invoices within 30 days of receipt as required by Article 17 below.

7. TERMINATION

A. The CLIENT may terminate this AGREEMENT in the whole or in part at any time by written notice to PARSONS ES. Such termination shall be effective in the manner specified in the said notice, shall be without prejudice to any claims which the CLIENT may have against PARSONS ES and shall be subject to the other provisions of this AGREEMENT. On receipt of such notice PARSONS ES shall, except as and to the extent directed, immediately discontinue the services and the placing of subcontractor orders for materials, facilities and supplies in connection with the performance of the services, and shall, if requested, make every reasonable effort to procedure termination of existing subcontracts upon terms satisfactory to the CLIENT. Thereafter, PARSONS ES shall do only such work as may be necessary to preserve and protect the services already in progress and to dispose of any property as requested by the CLIENT.

B. A complete settlement of all claims of PARSONS ES upon termination of the AGREEMENT, as provided in the preceding paragraph, shall be made as follows: (A) the CLIENT shall assume and become liable for all obligations and commitments that PARSONS ES may have in good faith undertaken or incurred in connection with the services which have not been included in prior payments (B) the CLIENT shall compensate PARSONS ES for the reasonable cost of terminating existing subcontracts and preserving, protecting or disposing of the CLIENT's property and performing any other necessary services after the notice of termination has been received (C) the CLIENT shall pay PARSONS ES for a Services performed, prior to date of termination, in accordance with this AGREEMENT. Prior to final settlement, PARSONS ES shall deliver to the CLIENT all Documents and all other required information and data prepared by PARSONS ES under this AGREEMENT and execute and deliver all documents, and take such other steps as are necessary, to vest fully in the CLIENT the rights and benefits of PARSONS ES arising from subcontracts issued in connection with this AGREEMENT, unless otherwise requested by the CLIENT in writing.

8. WARRANTY

PARSONS ES warrants that the services to be rendered pursuant to this AGREEMENT shall be performed in accordance with the standards customarily provided by an experienced and competent professional engineering organization rendering the same or similar services.

9. INDEMNITY

PARSONS ES shall indemnify, defend and hold the CLIENT harmless from and against claims, liabilities, suits, loss, cost, expense and damages arising from any negligent act or omission of PARSONS ES in the performance of work and service pursuant to this AGREEMENT. PARSONS ES' liability for all of the aforesaid matters is limited to the proceeds recovered from the insurance carried by PARSONS ES and within the monetary limits of the insurance specified in Article 13 hereto after settling claims of third parties.

10. FORCE MAJEURE

The respective duties and obligations of the parties hereunder (except the CLIENT's obligation to pay PARSON ES such sums as may become due from time to time for services rendered by it) shall be suspended while and so long as performance thereto is prevented or impeded by strikes, disturbances, riots, fire, severe weather, governmental action, war acts, acts of God, acts of the CLIENT, or any other cause similar or dissimilar to the foregoing which are beyond the reasonable control of the party from whom the affected performance was due.

11. ASSIGNMENTS

All obligations and covenants herein contained shall be intended to be binding upon the successors and assigns of PARSONS ES and the CLIENT. PARSONS ES shall not assign this AGREEMENT without the prior written consent of the CLIENT, which consent shall not be unreasonably withheld.

12. CONSEQUENTIAL DAMAGES

In no event shall PARSONS ES or its subcontractors or vendors of any tier be liable in contract, tort, strict liability, warranty, or otherwise for any special, indirect, incidental or consequential damages, such as but not limited to, loss of product, loss of use of the equipment or system, loss of anticipated profits or revenue, non-operation or increased expense of operation of other equipment of systems, cost of capital, or cost of purchased or replacement equipment of systems.

13. INSURANCE

PARSONS ES shall place and maintain with responsible insurance carriers the following insurance. At CLIENT's request, PARSONS ES shall deliver to CLIENT certificates of insurance which shall provide thirty days notice to be given to CLIENT in event of a cancellation.

A. Workers' Compensation and Employer's Liability Insurance
- Workers Compensation in compliance with the applicable state and federal laws
- Employer's Liability Limit $1,000,000

B. Comprehensive General Liability Insurance including Blanket Contractual, XCU* Hazards, Broad Form Property Damage, Completed Operations and Independent Contractor's Liability all applicable to Personal Injury, Bodily Injury and Property Damage to a combined single limit of $1,000,000 each occurrence subject to $2,000,000 annual aggregate for Completed Operations and Personal Injury other than Bodily Injury.

*Explosion, Collapse and Underground

C. Comprehensive Automobile Liability Insurance including owned, hired and nonowned automobiles, Bodily Injury and Property Damage to a combined single limit of $1,000,000 each occurrence.

D. Architects & Engineers Professional Liability Insurance affording, professional, liability, if any, to a combined single limit of $1,000,000 each occurrence/claim, subject to $2,000,000 annual aggregate.

14. ACCEPTANCE BY CLIENT

The WORK shall be deemed accepted by CLIENT unless, within fifteen (15) days after receipt of PARSONS ES' written notification of final completion, CLIENT will have given PARSONS ES written notice specifying in detail wherein the WORK is deficient, whereupon PARSONS ES will promptly proceed to make necessary corrections and, upon completion, the WORK shall be deemed accepted by CLIENT.

15. CLIENT FURNISHED DATA, DRAWINGS, AND SPECIFICATIONS

PARSONS ES shall have no liability for defects in the WORK attributable to PARSONS ES' reliance upon or use of data, design criteria, drawings, specifications or other information furnished by CLIENT and CLIENT agrees to indemnify and hold PARSONS ES harmless from any and all claims and judgments, and all losses, costs and expenses arising therefrom. PARSONS ES shall disclose to CLIENT, prior to use thereof, defects or omissions in the data, design criteria, drawings, specifications or other information furnished by CLIENT to PARSONS ES that PARSONS ES may reasonably discover in its review and inspection thereof.

16. REUSE OF DOCUMENTS

All documents including drawings and specifications prepared by PARSONS ES pursuant to this AGREEMENT are instruments of its services in respect of the PROJECT. They are not intended or represented to be suitable for reuse by CLIENT or others on extension of the PROJECT or on any other project. Any reuse without specific written verification or adaptation by PARSONS ES will be at CLIENT's sole risk and without liability or legal exposure to PARSONS ES, and CLIENT shall indemnify and hold harmless PARSONS ES from all claims, damages, losses and expenses including attorney's fees arising out of or resulting therefrom. Any such verification or adaptation will entitle PARSONS ES to further compensation at rates to be agreed upon by CLIENT and PARSONS ES.

17. INVOICING AND PAYMENT

Invoices are due and payable within 39 days after receipt. Interest at the rate of 1¼% per month or the maximum rate allowable under the usury laws of the state in which the work is performed, whichever is lower, is due an all payments not paid on or before the 45th day after the invoice date. Interest shall be computed from the date of the invoice. In the event legal proceedings are necessary to collect payments not paid when due, CLIENT shall pay, in addition to such payments, PARSONS ES' reasonable attorney's fees and legal costs associated therewith.

In addition, PARSONS ES may, after giving seven days written notice to CLIENT, suspend services under this AGREEMENT until PARSONS ES has been paid in full all amounts due for services, expenses and charges. The contract value shall be increased accordingly by the amount of PARSONS ES' reasonable costs of shut down, delay and start up, which shall be effected by Change Order in accordance with Article 5, above.

If CLIENT disputes any portion of a request for payment, CLIENT shall pay the undisputed portion of such request as provided herein and shall promptly notify PARSONS ES of the amount in dispute and the reason therefor. Any portion of the disputed amount which is ultimately agreed upon by CLIENT and PARSONS ES, to be owed to PARSONS ES, shall accrue interest at the rate and commencing upon the date stipulated in this Article.

Unless otherwise specified on the face page of this AGREEMENT, invoices will not require support documentation.

18. AUDIT

PARSONS ES shall maintain records and accounts on a generally recognized accounting basis to support all charges billed to CLIENT. said records shall be available for inspection by CLIENT or his authorized representative at mutually convenient times. However, there will be no financial audit of any lump sum amount, PARSONS ES' fixed rates or unit rates or fixed percentages.

19. EQUAL EMPLOYMENT OPPORTUNITY

The Non-Discrimination clause contained in Section 202, Executive Order 11246, as amended, relating to Equal Employment Opportunity for all persons without regard to race, color, religion, sex, or national origin and the implementing rules and regulation prescribed by the Secretary of Labor (41 CFR, Chapter 60, 41 CFR 60-250 and 41 CFR 60-741) are incorporated herein.

20. ORDER OF PRECEDENCE

Any inconsistency or conflict between the standard terms and conditions set forth herein and those typed on the face of this AGREEMENT or any attachment thereof shall be resolved by giving precedence in the following order. First, typed instructions and/or conditions on the face of this AGREEMENT; Second, the Standard Terms and Conditions; and Third, the attachment(s) (if any) attached hereto.

CHANGES IN THESE TERMS AND CONDITIONS ARE NOT BINDING ON PARSONS ES UNLESS THEY ARE IN WRITING AND SIGNED BY AN AUTHORIZED REPRESENTATIVE OF PARSONS ES.

Appendix A

Supplemental Terms and Conditions

Dispute Resolution Provisions

Notwithstanding anything to the contrary elsewhere in this Agreement or Contract, in the event of a dispute between the parties arising out of or related to this Agreement or Contract, the parties shall use the following procedure as a condition precedent to either party pursuing other available remedies:

1. A party who believes a dispute exists (the "Disputing Party") shall put such dispute in writing to the other party (the "Responding Party"). Such writing shall clearly, though as briefly as practicable, state the substance and scope of the dispute, the Disputing Party's position relative thereto, including legal and factual justifications therefor, the remedy sought, and any other pertinent matters.

2. The Responding Party who receives such a writing shall respond in writing to the Disputing Party within ten business days. Such writing shall clearly, though as briefly as practicable, state the Responding Party's response to each of the items included in the Disputing Party's writing, and any other pertinent matters.

3. A meeting shall be held within ten business days attended by representatives of the parties having decision-making authority regarding the dispute, to attempt in good faith to negotiate a resolution of the dispute.

4. If, within ten business days after such meeting, the parties have not succeeded in negotiating a resolution of the dispute, the parties' representatives shall submit the dispute to one of their senior-level executives (including Presidents, Executive Vice Presidents, Senior Vice Presidents, and Chief Financial Officers) for review. A meeting shall be held within ten business days after such submission attended by such senior-level executives of the parties and any necessary representatives to attempt in good faith to negotiate a resolution of the dispute.

5. If, within ten business days after such meeting, the parties have not succeeded in negotiating a resolution of the dispute, the parties shall jointly appoint a mutually acceptable neutral person (the "Neutral"), or if they have been unable to agree upon such appointment within ten business days, then the American Arbitration Association by default, or other mutually agreed-upon organization, shall appoint such Neutral upon the application of either party. The fees of, and authorized costs incurred by, the Neutral shall be shared equally by the parties.

6. In consultation with the Neutral, the parties shall select or devise an alternative dispute resolution procedure (ADR) by which they will attempt to resolve the dispute, and a time and place for the ADR to be held, with the Neutral making the decision as to any such matters, if the parties have been unable to agree thereon within ten business days after initial consultation with the Neutral.

7. The parties agree to participate in good faith in the ADR for a minimum period of ten business days from the commencement of the ADR procedure. If the parties are not successful in resolving the dispute through the ADR, and the amount in dispute does not exceed $250,000.00, then the dispute shall be settled by arbitration in accordance with the Commercial Arbitration Rules of the American Arbitration Association, and judgment upon the award rendered by the arbitrator(s) may be entered in any court having jurisdiction. If the amount in dispute exceeds $250,000.00, then the parties may agree to submit the matter to binding arbitration, or either party may pursue other available remedies upon ten business days written notice to the other party specifying its intended course of action.

8. The parties may mutually agree in writing to extend any of the time periods stated herein. If a party fails to act within the time period specified herein, as mutually extended, such failure shall constitute waiver by such party of such condition, and the other party may proceed immediately to the next remedial step.

9. The parties agree that the ADR is a compromise negotiation for purposes of the federal and state rules of evidence. The entire procedure will be confidential. All conduct, statements, promises, offers, views and opinions, whether oral or written, made in the course of the ADR by any of the parties, their agents, employees, representatives or other invitees to the ADR and by the Neutral, who is the parties' joint agent for purposes of these compromise negotiations, are confidential and shall, in addition and where appropriate, be deemed to be work product and privileged. Such conduct, statements, promises, offers, views and opinions shall not be discoverable or admissible for any purposes, including impeachment, in any litigation or other proceeding involving the parties and shall not be disclosed to anyone not an agent, employee, expert, witness, or representative for any of the parties. Evidence otherwise discoverable or admissible is not excluded from discovery or admission as a result of its use in the ADR.

APPENDIX B

DIRECT LABOR RATES
FOR KEY PARSONS ENGINEERING SCIENCE, INC., PERSONNEL
(EFFECTIVE THROUGH 3/31/98) *

Carol Bowers	Administrative Management	$29.20
Dee Collins	Word Processing	$15.93
Jocelyn DeAngelis	CAD Operation/Design	$21.73
Ed Karkalik	Project Management	$40.16
Dan Krieg	Jr. Engineering	$19.61
Mike Leffler	Wastewater Management	$37.22
Beth McCartney	Sr. Engineering	$28.64
Tom McCreary	Contract Oversight	$23.68
Gordon Melle	Technical Direction/Review	$40.16
Keith Rankin	Constructability Review	$31.79
Alan Resnik	Certified Professional	$27.19
Sam Saad	Construction Observation	$18.10
Rick Volpi	Groundwater Hydrogeology	$24.72

* Rates subject to revision after 3/31/98

PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119
PARESCL/1197/Dee/MWO2-6

12 November 1997

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Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Completion of Lagoon No. 1

Dear Keith:

As we have discussed during the last few days, Canton Drop Forge, Inc. (CDF) has requested that Parsons Engineering Science, Inc. (Parsons ES) and The Beaver Excavating Company (Beaver) develop a plan for finishing Lagoon No. 1 during calendar year 1997, preferably by 15 December 1997, if practicable. This letter represents Parsons ES' understanding and commitment to provide the engineering support and construction observation services required to meet CDF's objective. Beaver is preparing a separate proposal letter for CDF's review and approval for the physical implementation of the Lagoon No. 1 completion.

PROJECT UNDERSTANDING

It is Parsons ES' understanding that CDF would like to finish the Lagoon No. 1 project before year-end 1997, and preferably by 15 December 1997, if practicable. To meet this objective, the following scope of work would be required to be completed:

1. complete all remaining scope items included in the original design for Lagoon No. 1, except as modified by previously agreed design change (i.e., location and position of pump) or described in the following items.
2. after finish placing, grading and compacting the bottom 12-inch clay layer over the remaining areas of the original Lagoon No. 1 surface, place and compact sufficient additional fill material in the Lagoon such that the final grade (after placement of the top, 6-inch clay layer) of the Lagoon maintains side slopes no steeper than 2.5:1 (i.e., 2.5 feet horizontally per 1 foot vertically; see attached sketch). Our rough calculations indicate that no more than about 1000 cubic yards (cu yd.) of additional fill material will be required to achieve the desired slopes. Of this volume, an estimated 500 cu yd. may be obtained from the surface of the bio-cell area; a cursory inspection of the bio-cell indicates that this volume of impacted and stabilized soil remains in the area. The remaining 500 cu yd. would be borrowed from a near-by source of clean fill material.
3. prior to accepting any fill material from the proposed source, conduct a RCRA characterization (e.g., TCLP) analysis and soil stability (e.g., CBR) test to verify the suitability of the borrow material with respect to environmental and geotechnical considerations.
4. after completing the placement of fill material to achieve the desired grades, install the top clay layer, finish the discharge piping and pump system (in accordance with the agreed design revisions), and install erosion protection (e.g., rip rap) at each of the five influent pipe locations.
5. finish grade the top bank (on the East side of the Lagoon) and install a sewer line to provide a means to collect and convey the surface water, which accumulates in this area during a storm event, to a depressed area and then into Lagoon No. 1.

FIGURE 1

CANTON DROP FORGE, INC.
LAGOON NO. 1 COMPLETION

PROJECT COST ESTIMATE

CSTEST01

		LABOR										ODCs	TOTAL
TASK DESCRIPTION	Billing Title Category / Rate	PROJ MGR EJK $112	SENIOR ENGR EJM $80	PROJ ENGR DAK $55	TECH DIR GJM $112	FIELD ENGR SSS $51	CERT PROF AJR $80	ADMIN SUPV CMB $82	ADMIN SUPP DB $28	WORD PROC DAC $45	Total Hours / Total Cost	ODCs	Total Task Cost
1 Planning, Design and Contracting Support	hours	10	2	5	1			0.5		1	19.5		
	$	$1,124	$160	$275	$112	$0	$0	$41	$0	$45	$1,757	$202	$1,959
2 Construction Observation (1)(2)	hours	10			1	30			0.5		41.5		
	$	$1,124	$0	$0	$112	$1,520	$0	$0	$14	$0	$2,771	$462	$3,233
3 Project Closure (for VAP File)	hours	2					4		0.5	1	7.5		
	$	$225	$0	$0	$0	$0	$321	$0	$14	$45	$604	$193	$797
	hours										0		
	$	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	hours										0		
	$	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	hours										0		
	$	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	hours										0		
	$	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	hours										0		
	$	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Units	Hours	22	2	5	2	30	4	0.5	1	2	68.5	PROJECT Total=	
Total Costs (2)	Cost	$2,474	$160	$275	$225	$1,520	$321	$41	$28	$89	$5,133	$857	$5,990

NOTES:

(1) Assumes a four-week construction duration, in which there are seven productive work-days. If schedule delays are encountered or additional work-days are required, this LOE estimate may increase.

(2) Costs for full-time construction observation, if required, could add $1,509 to the project budget, bringing the Total Costs to $7,499.

CDF006727

CANTON DROP FORGE, INC.
LAGOON NO. 1 COMPLETION

PROJECT COST ESTIMATE

CSTEST01

	ODCs								
	COMMUNICATIONS				TRAVEL	COMPUTER		PRINTING	
	Teleph ($)	FAX ($)	Fed Ex ($)	Postage ($)	Mileage (mi.)	General (hr)	WP (hr)	Copier (ea)	Blue Prints (ea)
TASK DESCRIPTION	1	1	1	1	0.31	10	10	0.10	1
1 Planning, Design and Contracting Support	15	10	10	10	150	6	2	200	10
	$15	$10	$10	$10	$47	$60	$20	$20	$10
2 Construction Observation (1)(2)	50	20			1200	2			
	$50	$20	$0	$0	$372	$20	$0	$0	$0
3 Project Closure (for VAP File)		10	20	3		4	1	1000	10
	$0	$10	$20	$3	$0	$40	$10	$100	$10
	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Units	65	40	30	13	1350	12	3	1200	20
Total Costs (2)	$65	$40	$30	$13	$419	$120	$30	$120	$20

NOTES:

(1) Assumes a four-week construction duration, in which there are seven productive work-days. If schedule delays are encountered or additional work-days are required, this LOE estimate may increase.

(2) Costs for full-time construction observation, if required, could add $1,509 to the project budge bringing the Total Costs to $7,499.

CDF006728

THE BEAVER EXCAVATING CO.
4650 Southway St. SW
P.O. Box 6059
CANTON, OHIO 44706

(330) 478-2151
FAX (330) 478-2122

2(b)
3

LETTER OF TRANSMITTAL

DATE 11-7-97	JOB NO. 2693
ATTENTION KEITH HOUSEKNECHT	
RE: CATCH BASIN & PIPING	

TO CANTON DROP FORGE

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via ________ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ ________

COPIES	DATE	NO.	DESCRIPTION
2	—		CAT CUTS FOR N-12 PIPE, CORR HDPE
			& CATCH BASINS

THESE ARE TRANSMITTED as checked below:

☒ For approval ☐ Approved as submitted ☐ Resubmit ______ copies for approval

☒ For your use ☐ Approved as noted ☐ Submit ______ copies for distribution

☒ As requested ☐ Returned for corrections ☐ Return ______ corrected prints

☐ For review and comment ☐ ________

☐ FOR BIDS DUE ________ 19 ______ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS ________

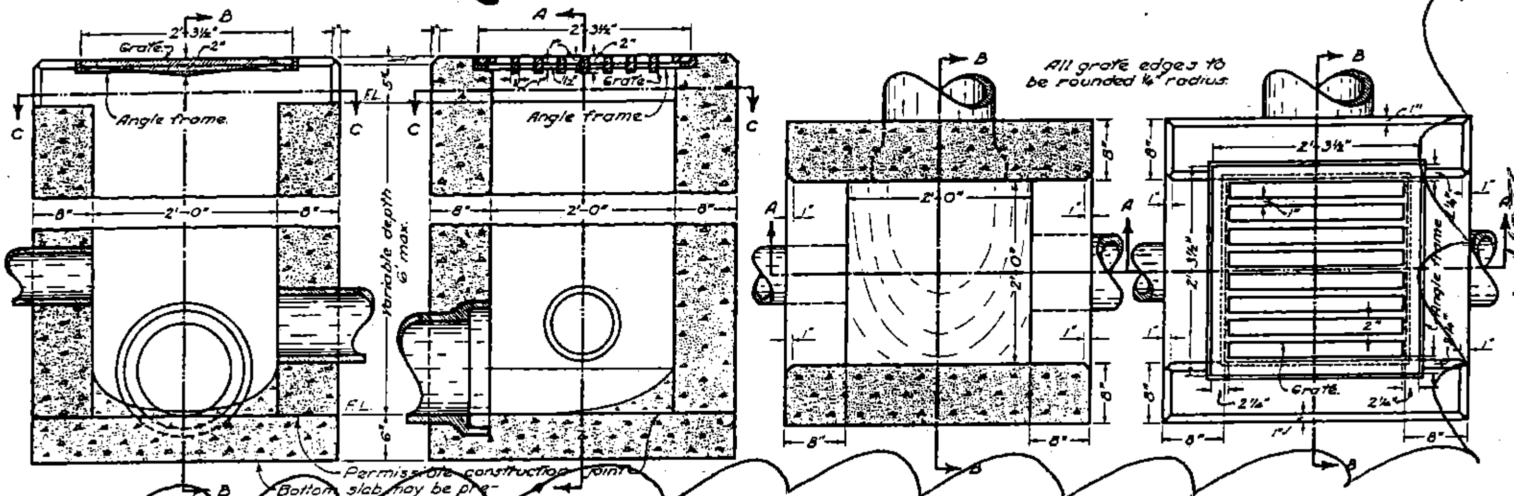
CDF006729

COPY TO ED KARKALIK - PARSONS ENG.

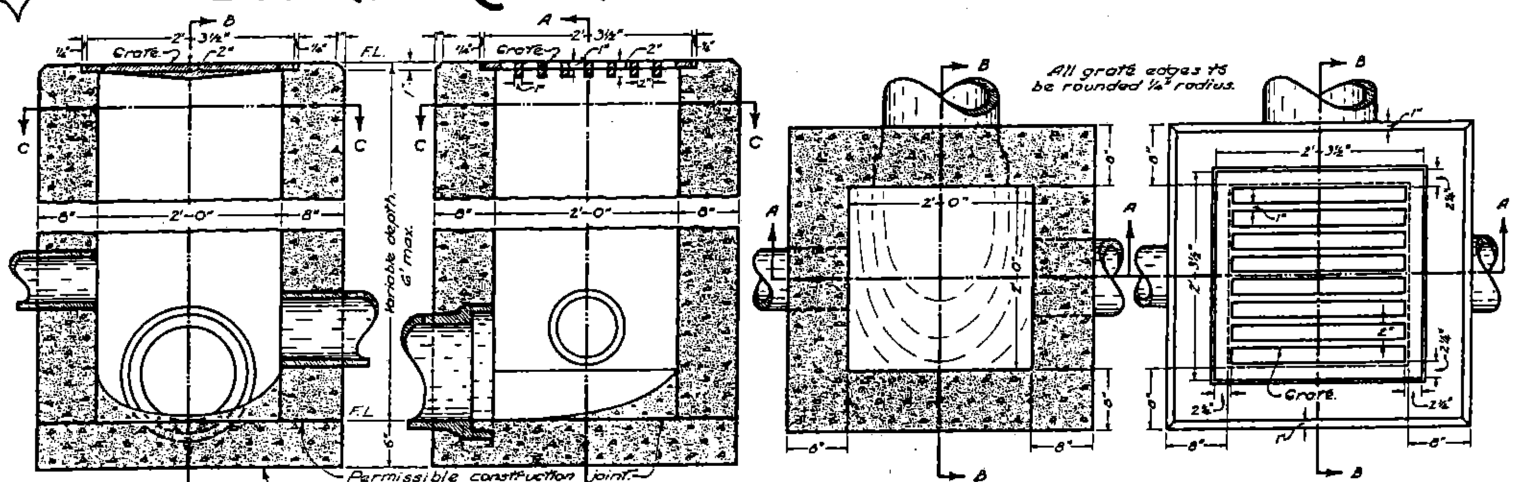
SIGNED: STAN EVANS

If enclosures are not as noted, kindly notify us at once.

STANDARD No. 2-2-A CATCH BASIN



STANDARD No. 2-2-B CATCH BASIN



LOCATION and elevation when given on the plans is top center of the grate. When side openings are provided, elevation shall be the flow line of the side inlet.

GRATING AND FRAME – The design shall be essentially the same and equally as strong as the one shown hereon.

Weight of grate, minimum, 120 lbs.
Weight of frame minimum, 40 lbs.

NOTE

BRICK, concrete block or cast-in-place walls have a nominal thickness of 8 inches. Precast walls shall have a minimum thickness of 6 inches and be reinforced sufficiently to permit shipping and handling without damage. Brick or concrete block shall not be used above the flow line of the side opening for type 2-2-A.

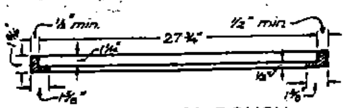
2-2-A SIDE INLETS to be placed 4 to 6 inches below normal elevations of median or ditch flow line returning to normal 10 feet each side of basin.

2-2-B GRATE elevation to be placed 4 to 6 inches below normal ditch returning to normal 10 feet each side of basin.

SIDE INLETS shall be provided on both sides of the No. 2-2-A catch basin in sags and on upstream side only where the ditch has a continuous down grade past the catch basin.

CONCRETE, cast-in-place, to be Class C. All precast concrete shall meet the requirements of 706.13 with 6 ±2% air void content in the hardened concrete and be marked with catch basin number.
OPENINGS for pipes shall be O.D. +2" when fabricated or field cut.

REINFORCING – #5 REBAR
6' CENTERS, EW



SECTION THROUGH ANGLE FRAME
FOR STANDARD No. 2-2-A CATCH BASIN

BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF TRANSPORTATION

DATE: 6-1-60, 5-1-79

CATCH BASINS

STANDARD CONSTRUCTION DRAWING CB-2-2-A & B

APPROVED [signature] ENGR. L. & D.

CDF006730

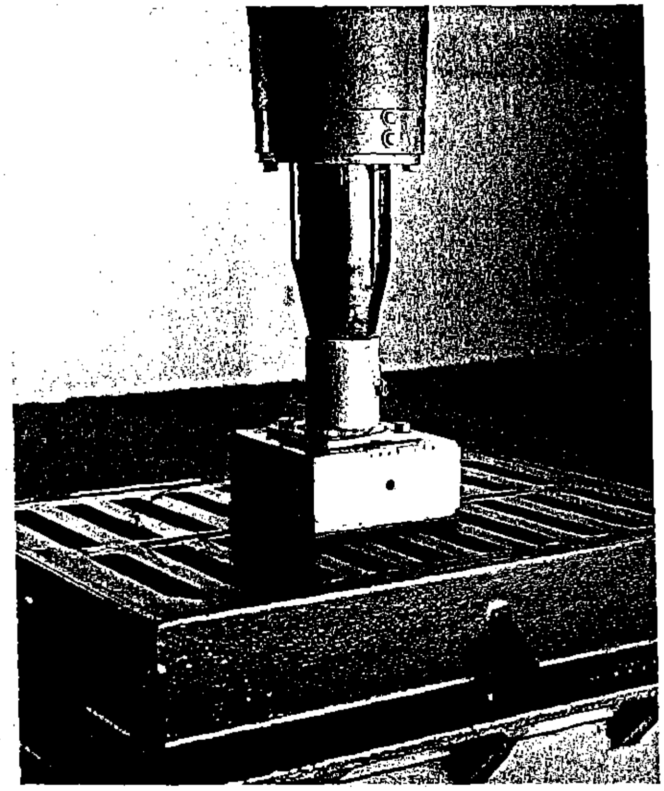
PROOF LOAD TESTING

Proof load tests at EJIW/VFC are performed in accordance with the latest revision of Federal Specification RR-F-621. For highway traffic service this test is described as 25,000 lb. load concentrated on a 9" x 9" area placed in the center of the grate or cover and held for one minute. Following the test the casting is carefully inspected. Any crack or permanent deformation will cause the casting to be rejected. Many EJIW castings are tested far beyond the specified proof load, often to destruction. East Jordan Iron Works, Inc. maintains a load bearing testing machine and has been actively testing street castings for many years.

ADVANTAGES OF GRAY AND DUCTILE IRON

Gray iron has an unequaled record of success as a material for construction and utility castings. Engineers and design professionals specify gray iron for its many outstanding properties. Gray iron is highly resistant to corrosion, maintains compressive strength, abrasion resistance, vibration absorption, and low-notch sensitivity. It also allows a great deal of design freedom, as illustrated in the following pages of this catalog. Gray iron combines all these features, has a long service life, and is also very cost effective. EJIW manufactures gray iron street castings in accordance with ASTM A48.

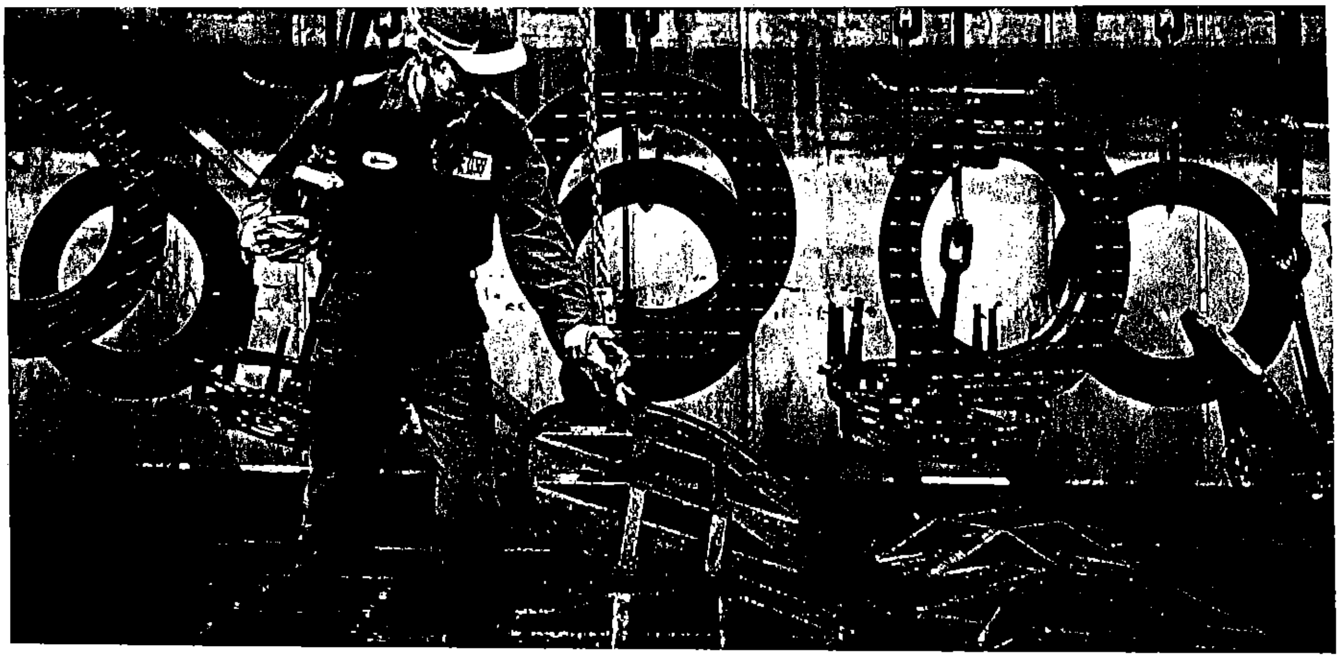
Ductile iron combines the advantages of gray iron with greater strength, toughness, and impact resistance. Because it has the ability to withstand greater loads without failure, it is often specified for extra-heavy load applications. EJIW supplies ductile iron in accordance with ASTM A536.



SERVICE LOAD DESIGNATION

Light, heavy, and extra heavy duty designations are assigned to EJIW castings to reflect load ratings. The most widely accepted criteria for highway traffic loading comes from "Standard Specifications for Highway Bridges" published by AASHTO (American Association of State Highway and Transportation Officials). This specification defines the H20 loading condition as a two axle truck, and the HS20 loading condition as a tractor truck with a tandem axle semi trailer. In both loading cases the maximum axle load is 32,000 pounds, or 16,000 pounds for each set of dual wheels. All EJIW castings designated as heavy duty are designed to meet or exceed this loading criteria.

EJIW sales and engineering personnel are available for consultation to ensure that properly designed products are provided to meet project specifications. Do not use light duty castings for a heavy duty application! Involve EJIW personnel if you are in doubt of your design requirements.



COATING OF CONSTRUCTION CASTINGS

Most Municipal Authorities and Consulting Engineers specify that gray and ductile iron castings used for utility construction shall be coated with asphaltic paint. In some cases a minimum mill-thickness for the coating is specified. To meet this customer requirement, East Jordan Iron Works, Inc. has installed a modern casting coating facility.

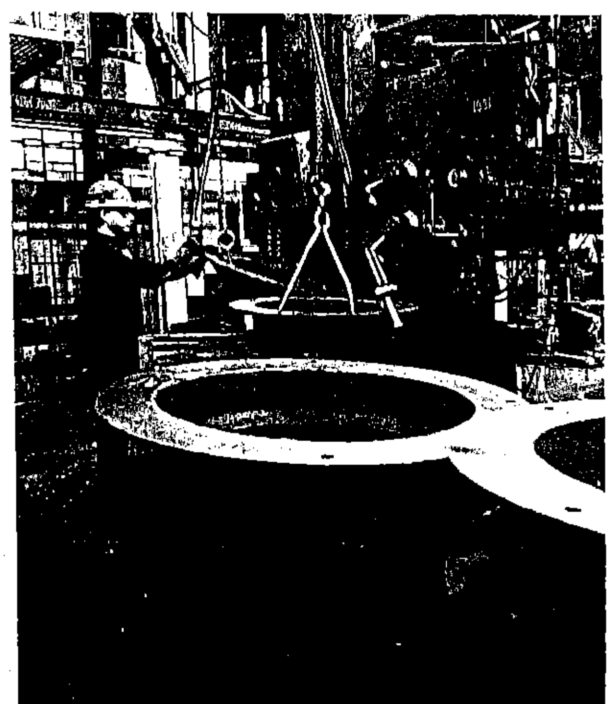
Castings are coated on-line immediately after cleaning and machining. Each casting passes through a pre-heat oven which provides proper casting temperature prior to passing through the coating tank. Precise monitoring of the coating formulation and casting inspection assures that coating quality and consistency is maintained.

Unless otherwise specified by the customer, all East Jordan construction castings are coated with a water base asphalt paint. This material is a nontoxic, nonflammable, and odorless asphalt emulsion that dries to a hard, black gloss finish. Unlike asphalt varnishes and cutbacks which are thinned with petroleum distillates such as naphtha, this asphalt emulsion is thinned with water for our application process. East Jordan Iron Works Inc., can provide construction castings with a premium protective asphalt coating which is environmentally safe.

This same asphalt coating meets the requirements of AWWA C104 for interior coating of pipes in potable water systems.

MACHINED BEARING SURFACES

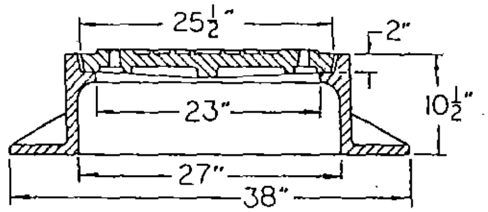
Machined bearing surfaces are standard on many East Jordan Iron Works, Inc. construction and utility castings. Accurately machined bearing surfaces eliminate rocking caused by uneven seating surfaces. This feature is in accordance with section 3.101.1 of Federal Specification RR-F-621. "Frames, Covers, Grating, Steps, Sump and Catch Basins, Manholes."

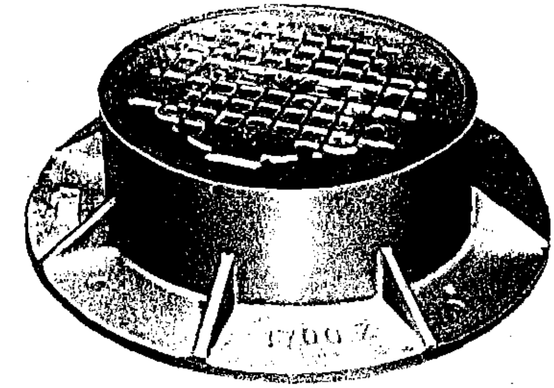


Heavy Duty

1700 *(Specify type cover or grate)*

Machined bearing surfaces





Type Cover	Total Wt. (lbs.)	Type Grate	Total Wt. (lbs.)
B Perforated	560	M Flat	560

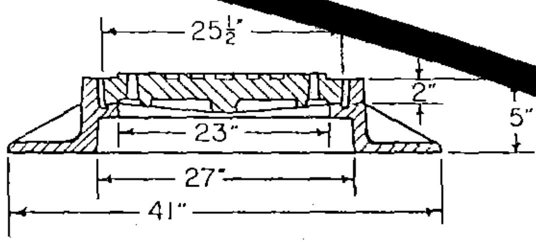
OPTIONS: Solid, vented, & gasket seal covers

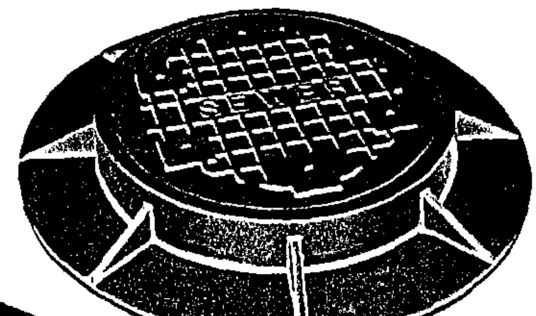
Type M
Flat Grate
Approx. 120 sq. in. of opening

Heavy Duty

[illegible]703 *(Specify type cover or grate)*

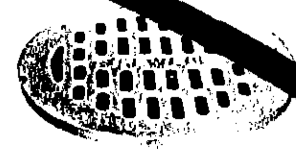
Machined [illegible] surfaces





Type Cover	Total Wt. (lbs.)	Type Grate	Total Wt. (lbs.)
B Perforated	475	M Flat	475

OPTIONS: Solid or vented covers



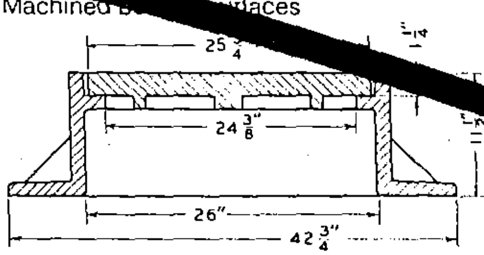
Type M
Flat Grate
Approx. 120 sq. in. of opening

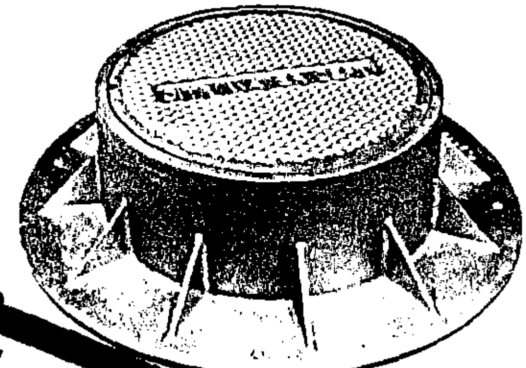
Heavy Duty

[illegible]05 *(Specify type cover or grate)*

Machined [illegible] surfaces

Type P
Concave Grate
Depth of concave ¾"
Approx. 120 sq. in.
of opening





Type Cover	Total Wt. (lbs.)	Type Grate	Total Wt. (lbs.)
A Solid	600	P Concave	585
E Ring	610		

OPTIONS: 2 piece type E cover – inner cover 9¼" diameter – ring cover has 8" diameter access opening

The Only Stormwater Drainage Pipe That Practically Joins Itself

Hancor®
SureLok®
A Self-Locking Hi-Q® Pipe System

CDF006734

Engineered Strength

Sure-Lok® pipe is designed with a corrugated exterior and smooth interior for optimal strength. Backfilled with the same material required for any typical drainage installation, Sure-Lok pipe can withstand highway traffic loads with just 1' (0.3 m) of cover and deep fills up to 20' (6 m) or more. In addition, Hancor area engineers and application engineers can provide backfill recommendations to permit even deeper burials.

- Withstands highway traffic loads with only 1' (0.3 m) of cover.
- Strong enough to withstand fills up to 20' (6 m) deep or more.
- Backfill requirements for Sure-Lok are the same as for other quality pipe installations.

Superior Hydraulics

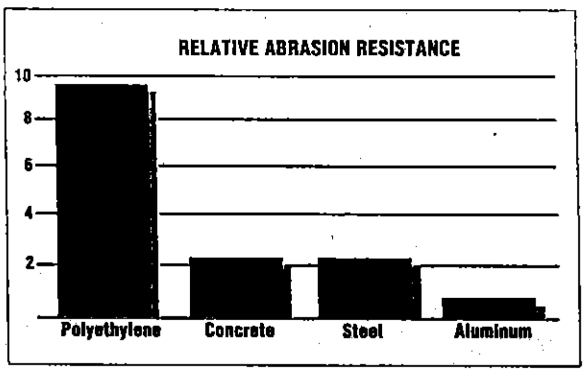
Superior hydraulics mean you can often downsize your piping network from what is required for other materials. Sure-Lok pipe offers 30% to 50% more capacity than corrugated steel, aluminum or reinforced concrete pipe. Independent laboratory testing has demonstrated a conservative design Manning's "n" value of 0.010.

- Improves long-term hydraulic efficiency.
- Won't snag debris or encourage sediment even on shallow grades.
- Pipe systems can be downsized, reducing material and installation costs.

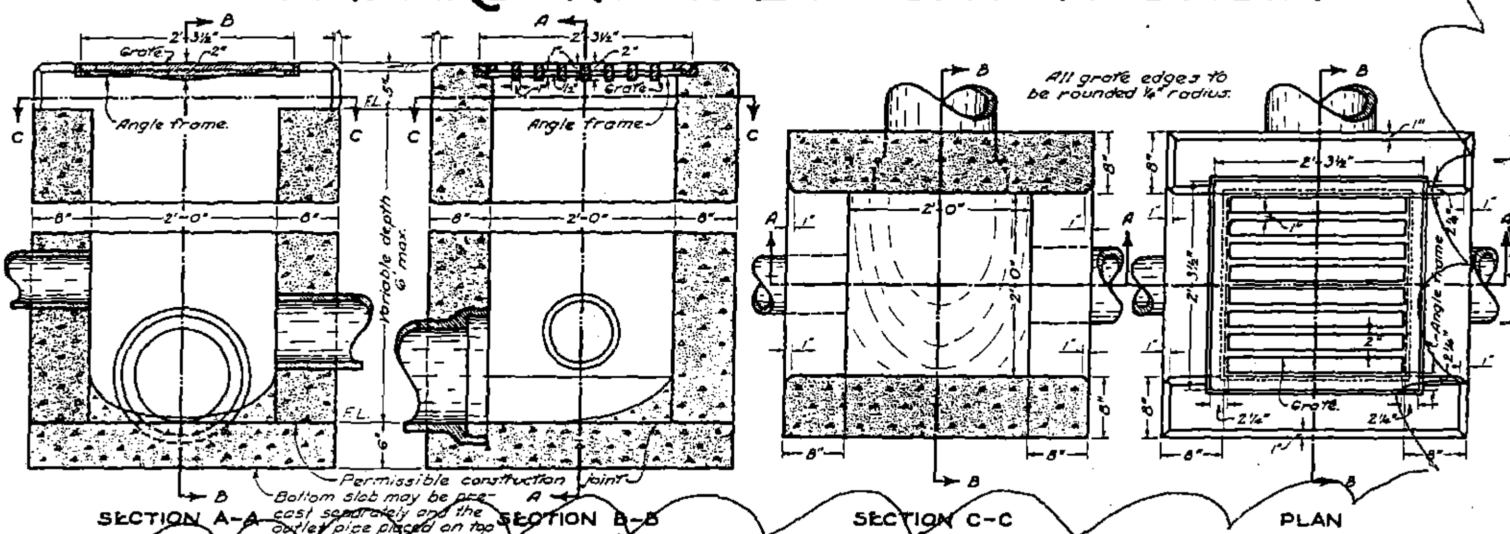
Excellent Durability

High density polyethylene (HDPE) pipe has proven itself to be one of the most durable materials available for stormwater drainage products. HDPE resists aggressive chemicals such as road salts, motor oils and fuels. Sure-Lok pipe won't rust, deteriorate or crumble. HDPE is over three times as abrasion-resistant as concrete and steel, and exceeds aluminum's abrasion resistance by a factor of 10.

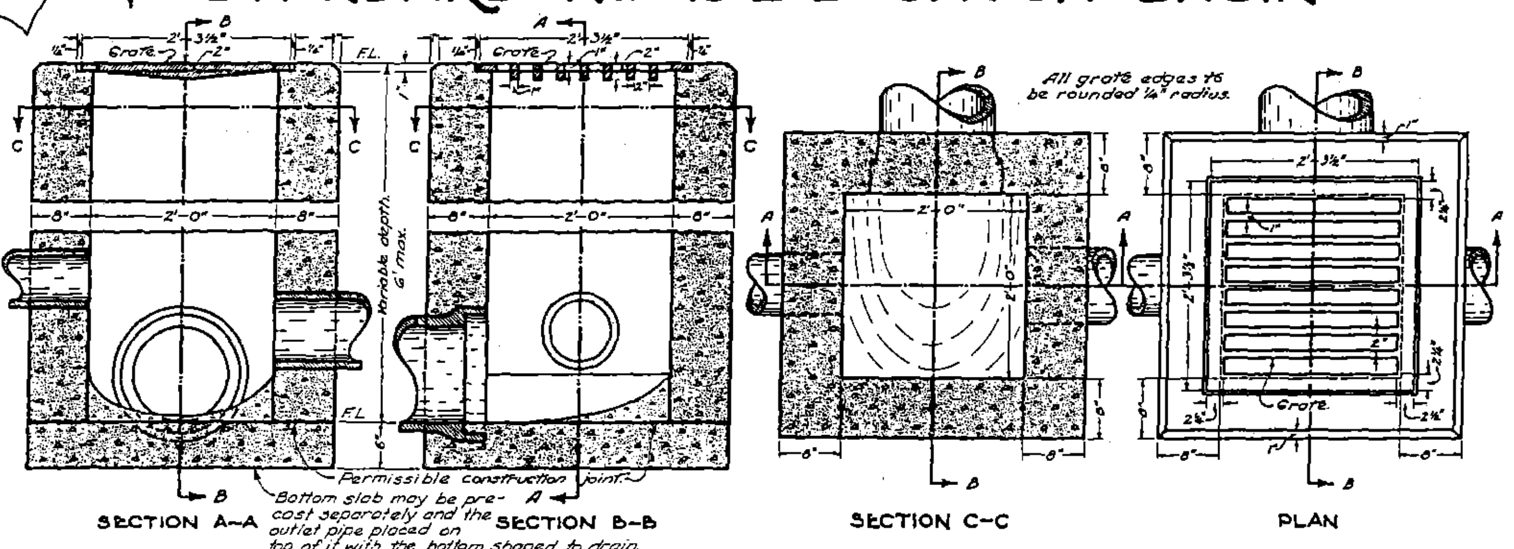
- Resists aggressive chemicals such as road salts, motor oils and fuels.
- Unaffected by extremes in pH.
- Withstands repeated freeze-thaw cycles and continuous subzero temperatures.
- Won't rust, deteriorate or crumble.
- Highly abrasion-resistant.



STANDARD No. 2-2-A CATCH BASIN



STANDARD No. 2-2-B CATCH BASIN



LOCATION and elevation when given on the plans is top center of the grate. When side openings are provided, elevation shall be the flow line of the side inlet.

GRATING AND FRAME – The design shall be essentially the same and equally as strong as the one shown hereon.
Weight of grate, minimum, 120 lbs.
Weight of frame minimum, 40 lbs.

BRICK, concrete block or cast-in-place walls have a nominal thickness of 8 inches. Precast walls shall have a minimum thickness of 6 inches and be reinforced sufficiently to permit shipping and handling without damage. Brick or concrete block shall not be used above the flow line of the side opening for type 2-2-A.

2-2-A SIDE INLETS to be placed 4 to 6 inches below normal elevations of median or ditch flow line returning to normal 10 feet each side of basin.

2-2-B GRATE elevation to be placed 4 to 6 inches below normal ditch returning to normal 10 feet each side of basin.

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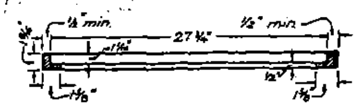
REINFORCING – #5 REBAR 6" CENTERS, EW



SECTION THROUGH ANGLE FRAME
FOR STANDARD No 2-2-A CATCH BASIN

BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF TRANSPORTATION

DATE 6-1-60 5-1-79

CATCH BASINS

STANDARD CONSTRUCTION DRAWING **CB-2-2-A & B**

APPROVED [signature] ENGR L & D

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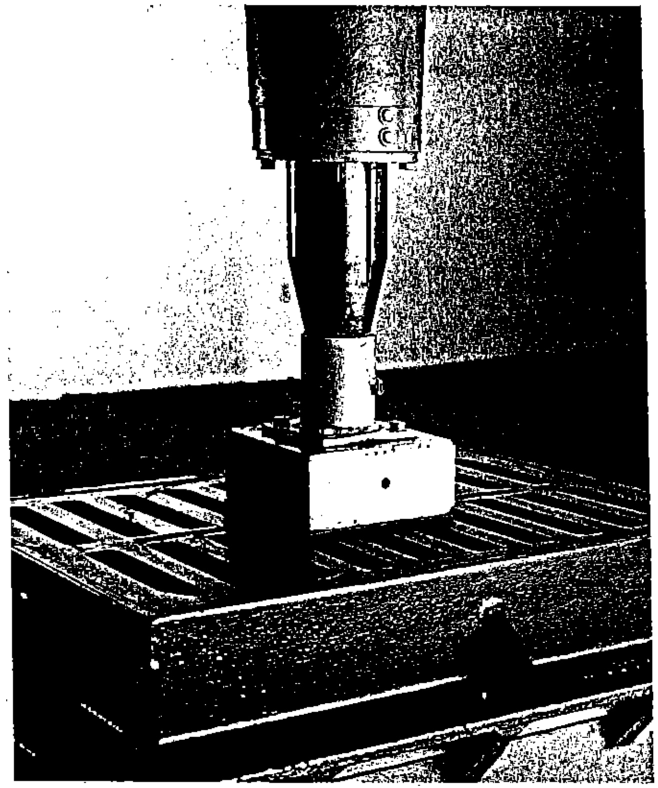

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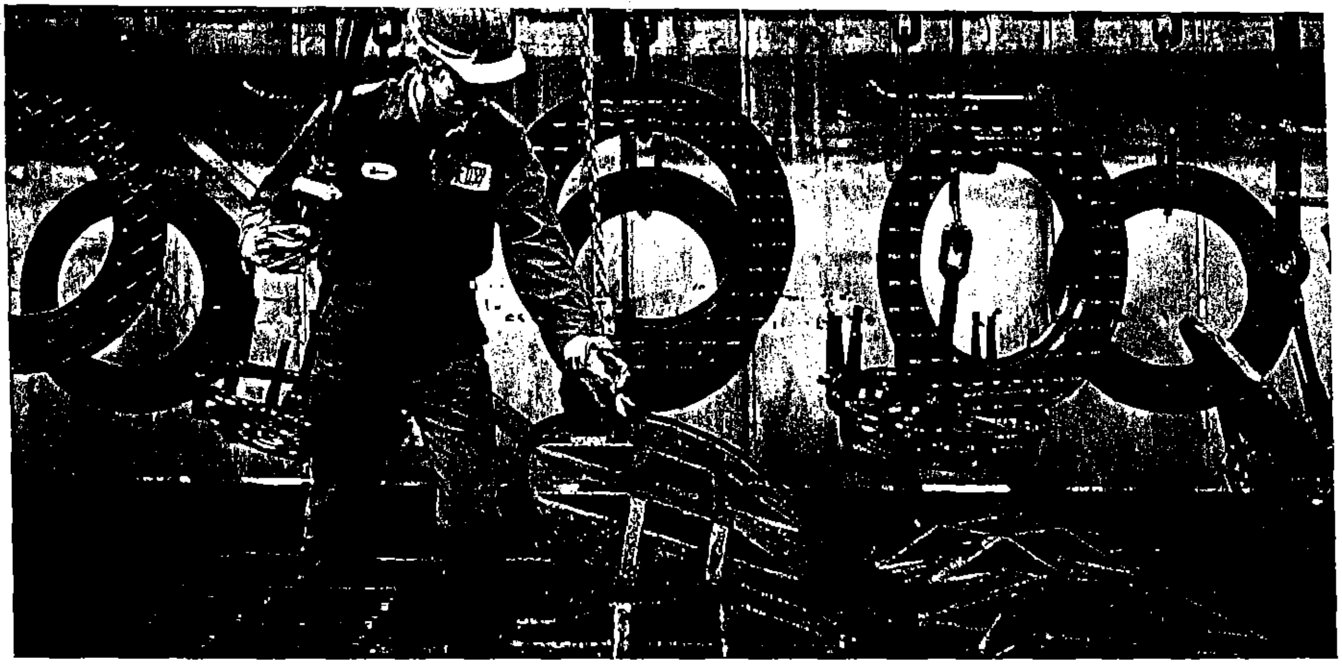

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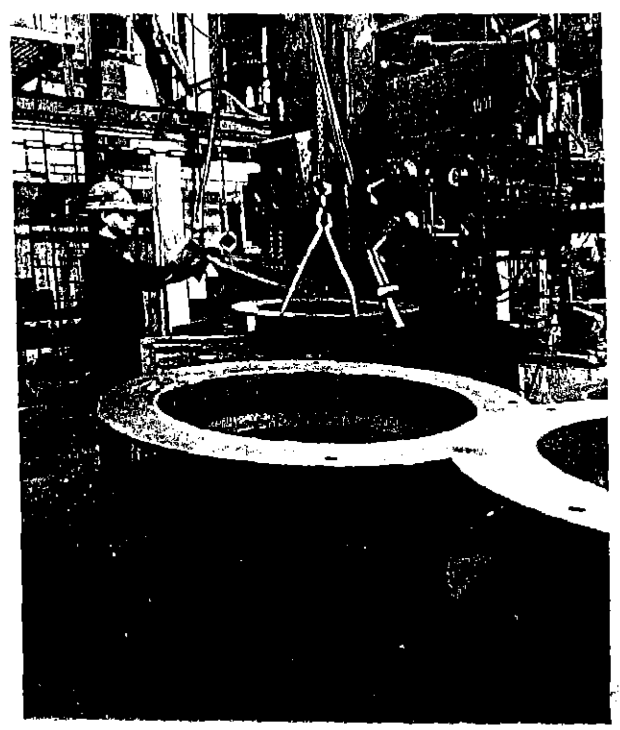
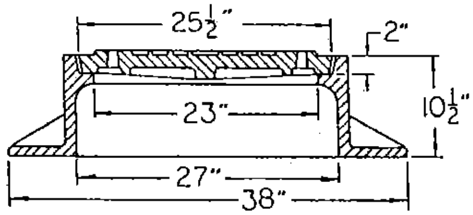
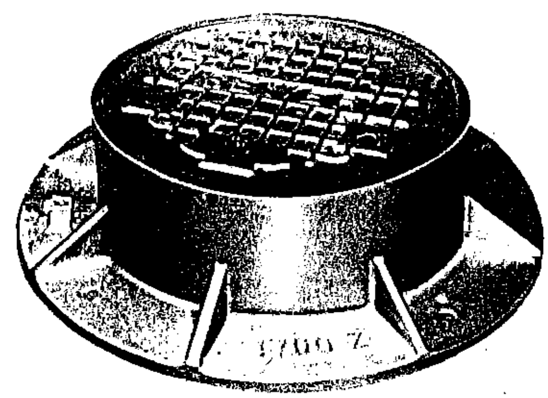


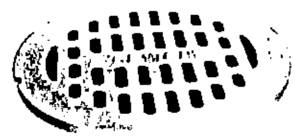
Heavy Duty
1700 *(Specify type cover or grate)*
Machined bearing surfaces





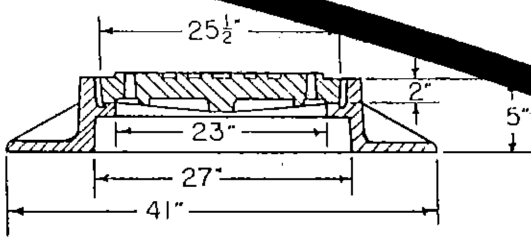
Type Cover	Total Wt. (lbs.)	Type Grate	Total Wt. (lbs.)
B Perforated	560	M Flat	560

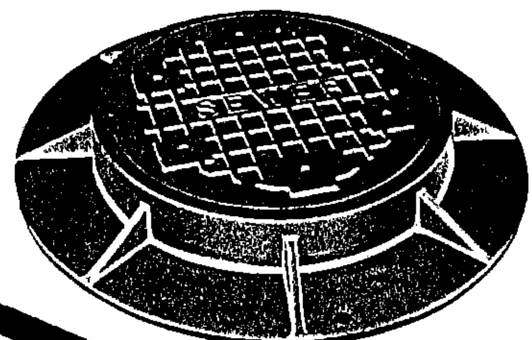
OPTIONS: Solid, vented, & gasket seal covers



Type M
Flat Grate
Approx. 120 sq. in. of opening

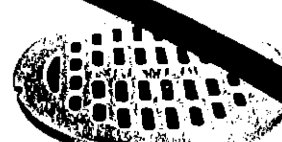
Heavy Duty
1703 *(Specify type cover or grate)*
Machined bearing surfaces





Type Cover	Total Wt. (lbs.)	Type Grate	Total Wt. (lbs.)
B Perforated	475	M Flat	475

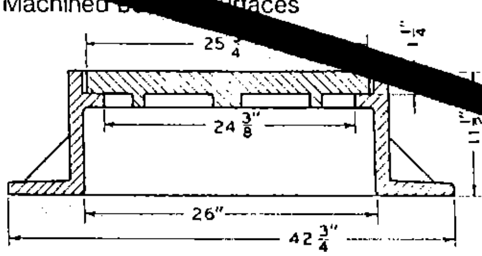
OPTIONS: Solid or vented covers

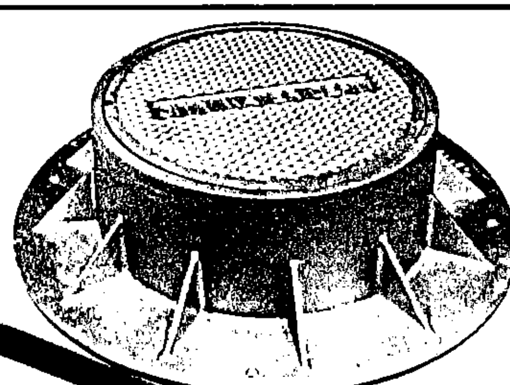


Type M
Flat Grate
Approx. 120 sq. in. of opening

Heavy Duty
1705 *(Specify type cover or grate)*
Machined bearing surfaces

Type P
Concave Grate
Depth of concave ¾"
Approx. 120 sq. in.
of opening





Type Cover	Total Wt. (lbs.)	Type Grate	Total Wt. (lbs.)
A Solid	600	P Concave	585
E Ring	610		

OPTIONS: 2 piece type E cover – inner cover 9¼" diameter – ring cover has 8" diameter access opening

The Only Stormwater Drainage Pipe That Practically Joins Itself

Hancor®
SureLok®
A Self-Locking Hi-Q® Pipe System

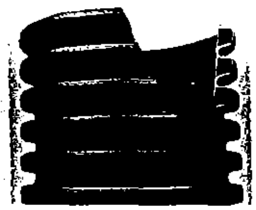
CDF006740

Engineered Strength

Sure-Lok® pipe is designed with a corrugated exterior and smooth interior for optimal strength. Backfilled with the same material required for any typical drainage installation, Sure-Lok pipe can withstand highway traffic loads with just 1' (0.3 m) of cover and deep fills up to 20' (6 m) or more. In addition, Hancor area engineers and application engineers can provide backfill recommendations to permit even deeper burials.

- Withstands highway traffic loads with only 1' (0.3 m) of cover.
- Strong enough to withstand fills up to 20' (6 m) deep or more.
- Backfill requirements for Sure-Lok are the same as for other quality pipe installations.

Superior Hydraulics



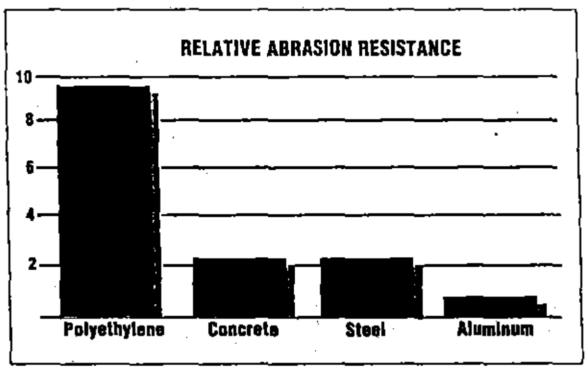
Superior hydraulics mean you can often downsize your piping network from what is required for other materials. Sure-Lok pipe offers 30% to 50% more capacity than corrugated steel, aluminum or reinforced concrete pipe. Independent laboratory testing has demonstrated a conservative design Manning's "n" value of 0.010.

- Improves long-term hydraulic efficiency.
- Won't snag debris or encourage sediment even on shallow grades.
- Pipe systems can be downsized, reducing material and installation costs.

Excellent Durability

High density polyethylene (HDPE) pipe has proven itself to be one of the most durable materials available for stormwater drainage products. HDPE resists aggressive chemicals such as road salts, motor oils and fuels. Sure-Lok pipe won't rust, deteriorate or crumble. HDPE is over three times as abrasion-resistant as concrete and steel, and exceeds aluminum's abrasion resistance by a factor of 10.

- Resists aggressive chemicals such as road salts, motor oils and fuels.
- Unaffected by extremes in pH.
- Withstands repeated freeze-thaw cycles and continuous subzero temperatures.
- Won't rust, deteriorate or crumble.
- Highly abrasion-resistant.



Canton Drop Forge, Inc.

Environmental Projects Status
as of October 31, 1997

Canton Drop Forge, Inc. Authorizations			Parsons Engineering Science, Inc. Implementation/Status		
P.O. Number	Description	Amount	WBS	Status of Work	Amount Spent
98072	Lagoon #1 / Biocell Study	$17,909	731397-01000	Complete, closed.	$17,340
98867	Lagoon #1 Sewers	$1,600	731397-02000	Complete, closed.	$1,600
98575	Lagoon #1 Design/Construction	$26,927	731397-03000	Construction suspended, pending approval of revised plan.	$26,446
98575-1	Lagoon #1 Contract Negotiation	$2,867	731397-03000	Complete.	$2,867
Pending	Lagoon #1 Add'l Constr'n Observ'n	$0	731397-03002	Pending approval of revised plan.	$0
98576	Lagoon #2 Sampling	$14,317	731397-04000	Complete, closed.	$14,317
98622	Lagoon #2 Bypass Pre-Design	$2,600	731397-05000	Complete, closed.	$2,600
	Subtotal	$66,220		Subtotal	$65,170
98252	Condensate Sampling	$7,000	731549-01000	Complete, closed.	$6,711
98623	Condensate Testing	$6,600	731549-02000	Complete, closed.	$6,600
	Subtotal	$13,600		Subtotal	$13,311
	TOTAL	$79,820		TOTAL	$78,481

Post-it® Fax Note 7671 | Date 11/12 | # of pages ▶ 1
To Keith Haselrech | From Ed K.
Co./Dept | Co.
Phone # | Phone #
Fax # | Fax #

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CDF006742

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PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119
PARESCL/1197/Dee/EJK7-58

13 November 1997

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Completion of Lagoon No. 1 Re-Construction Project

Dear Keith:

Based on several discussions with Mr. Stan Evans, of The Beaver Excavating Company (Beaver), Parsons Engineering Science, Inc. (Parsons ES) understands that Beaver proposes that the following incremental items and associated costs are required for the completion of the Lagoon No. 1 re-construction project. These items and costs are based on the assumptions listed in the "Project Understanding" section of Parsons ES' proposal to Canton Drop Forge, Inc. (CDF), dated 12 November 1997.

In particular, after closer scrutiny and analysis of the current and projected (i.e., 2.5:1) slope cross-sections, Beaver has confirmed that the amount of additional soil required to achieve the desired slopes is 1,080 cubic yards (cu.yd.). We have also assumed that there are about 500 cu.yd of oil-impacted soil remaining in the bottom of the bio-cell, available for fill after treatment. As a consequence, Beaver's incremental scope items and costs are:

1. Mixing, treatment, loading, transporting, placing and compacting about 500 cu yd. of oil-impacted and stabilized soil from the bio-cell area into Lagoon No. 1, based on unit prices of $13.54 and 11.72 per cu yd. for mixing/treating and for the balance of the activities, respectively (in accordance with the terms and conditions of CDF's contract with Beaver, dated 21 August 1997).

   $12,630

2. Borrowing (after screening for results of TCLP and compressive strength analyses), loading, transporting, placing and compacting about 580 cu yd. of clean fill from an off-site borrow area located nearby, at a unit price of $12.72 per cu yd.

   $7,378

3. General conditions (already covered in original contract). **$0**

4. Probable contingencies [including costs for: extensive (i.e., repeated) pumping of water from Lagoon No. 1; de-water (through addition of stock-piled admixtures); stripping and stock-piling the top layer due to moisture or frost; purchasing and adding Portland cement or incremental volumes of fly ash and lime, if required].

   $2,000

5. Performance bond (already covered in original contract). **$0**

======

TOTAL INCREMENTAL COSTS **$22,008**

2(b)
3

PARSONS ENGINEERING SCIENCE, INC.

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

DATE: 11/13/97

TO: MR. KEITH HOUSEKNECHT

LOCATION: CANTON DROP FORGE, INC.

RAPIDFAX NO.: (330) 477-2046

COPIES TO:

FROM: ED KARKALIK

TOTAL NUMBER OF PAGES 7 (including this cover letter)

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL BACK AS SOON AS POSSIBLE.

We are herewith transmitting the following:

DATE	NO.	DESCRIPTION
11/13/97	EJK758	PARSONS ES' LETTER RE: BEAVER SCOPE CHANGES 2pg
11/13/97	2693	BEAVER LETTER EXPLANATION OF CONTINGENCIES (2pg)
11/13/97	—	FAX FROM BEAVER ESTIMATING VOLUME REQUIRED (2pg)

KEITH -

AT LONG LAST, HERE IS BEAVER'S PIECE OF THE "FINISH LAGOON NO. 1" PUZZLE. STAN HAS CONFUSED BASE BID ITEMS NOT YET COMPLETED WITH INCREMENTAL ITEMS AS WELL AS SOME OF THE CONTINGENCY PROVISIONS. HENCE, THE NEED FOR MY COVER LETTER.

NOT YET COMPLETELY RECONCILED, HERE IS A "SNAP SHOT" OF BEAVER'S CONTRACT STATUS TO DATE:

ITEM	UNIT COSTS	VOLUMES ORIGINAL	VOLUMES CURRENT	COST IMPACT
CLAY PURCHASED/PLACED	$42.25/cy	1088 cy	1388 cy	+$12,675.00
LAGOON #1 MATERIAL REM/STAB/PLAC	53.40/cy	600	300	−16,020.00
BIOCELL MAT'L STABILIZED	13.54/cy	3000	3205	+ 2,775.70
BIOCELL MAT'L PLACED	11.72/cy	3000	3205	+ 2,402.60
				+$1833.30

WE WILL FINISH AUDIT OF THESE ITEMS TOMORROW. THERE ARE OTHER ITEMS, NOT SIGNIFICANT BUT NEEDING ACCOUNTING, TO ALSO CONSIDER (I.E. ELECTRICAL FOR PUMP CHANGES, ETC.)

JOB NO. 731397.03000

02000C02

ED

CDF006744

2(b)
3

THE BEAVER EXCAVATING COMPANY

November 13, 1997

Parson's Engineering Science
19101 Villaview Road, Suite 301
Cleveland, Ohio 44119

Attention: Ed Karkalik

Reference: Lagoon #1 Reconstruction
Our File #2693

Gentlemen:

Pursuant to your request and direction, we propose the following approximate quantities for completion of Lagoon #1 at 2 ½ : 1 side slopes:

Total to complete at 2 ½ : 1 slope (approximate)	1,780 cy + 10%	=1,960 cy.
12" clay layer (approximate)	400 cy + 10%	= (440 cy.)
6" clay layer (approximate)	400 cy + 10%	= (440 cy.)
General fill to 2 ½ : 1 slope (approximate)		= 1,080 cy.

Item # 2	Performance Bond (1%)		$ (-0-)
Item # 3	Mobilization/Demobilization (General conditions)		$(No Increase at this time)
Item #10	Oil impacted soil shredding, screening & stabilization	1,080 cy @ $13.54	$14,623.20
Item #11	Lower & upper clay layer placement & compacting		
	a.) 12" bottom layer	440 cy @ $42.25	$18,590.00
	b.) 6" top layer	440 cy @ $42.25	$18,590.00
Item #12	Stabilized soil placement & compacting	1,080 cy @ $11.72	$12,657.00

Note: We have 2 outside sources available for fill material.
We are presently having TCLP tests done on the closest source.

If material has to be hauled in from offsite in lieu of coming from the biocell we request the following additional charge to Item #12.
Source #1 if approved add $1.00/cy.
Source #2 if approved add $4.00/cy.
If neither source is approved then additional costs will need to be reviewed at a later date.

CDF006745

Parson's Engineering Science
Attn: Ed Karkalik
November 13, 1997
Page -2-

Item # ( )	Winter & weather contingencies: Such as, major dewatering, frost excavation, stripping of mud, add mixture conditioning to stabilize soils, any weather or delay related corrective measures etc., will be paid for on a time & material basis. Assume $500.00 - $2,000.00 probable cost but escalate to $10,000.00 to allow sufficient budget.	$10,000.00
	Budget Total for the Scope of This Letter	$74,460.20

All items to be in accordance with our original contract dated 8/21/97 (Section 00500, Form of Agreement).

If you have any questions please feel free to contact our office.

Thank You,

BEAVER EXCAVATING CO.

Stanley R. Evans
Project Manager

SRE:lf

2(b)
3

THE BEAVER EXCAVATING COMPANY

4650 SOUTHWAY S. W.
P.O. BOX 6059
CANTON, OHIO 44706
(330) 478-2151

FAX NUMBER (330) 478-2122

DATE: 11-13-97

NUMBER OF PAGES BEING SENT 8 INCLUDING THIS ONE.

TO: ED KARKALIK

COMPANY: PARSON'S ENG. SCIENCE

FROM: STAN EVANS

( ) THE ORIGINAL OF THIS TRANSMITTAL WILL BE SENT BY:
( ) REGULAR MAIL ( ) OVERNIGHT MAIL

(X) THIS WILL BE THE ONLY FORM OF DELIVERY OF THIS TRANSMITTAL

RE: DEDUCT 12" CLAY LAYER ONLY

FROM QUANTITY 1780 CY
+10% 180 CY
1960 CY
- 440 CY (12" layer)

1520 CY. FILL
- 440 CY (6" layer)
1080 CY

FULL SIZE TO FOLLOW.

IF YOU DO NOT RECEIVE ANY OF THESE PAGES, PLEASE CONTACT US AT (330) 478-2151 AS SOON AS POSSIBLE.

THANK YOU

STAN EVANS

CDF006747

2(D)
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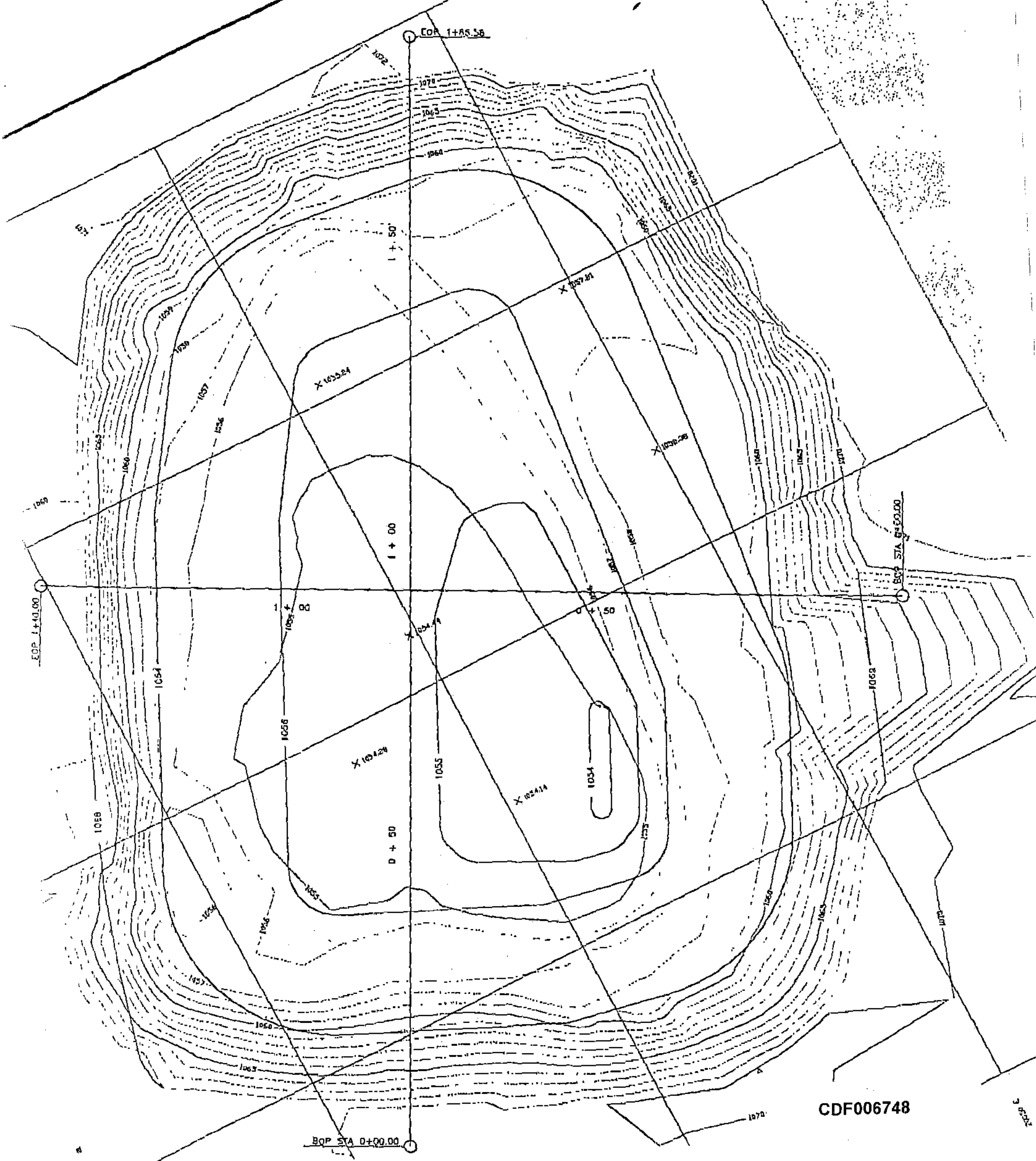
1" = 20' APPROX.



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NOV-13-97 THU 07:50 AM BEAVER EXCAVATING FAX NO. 3304782122 P. 02

PARSONS ENGINEERING SCIENCE, INC.

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

DATE: 11/13/97

TO: MR. KEITH HOUSEKNECHT

LOCATION: CANTON DROP FORGE, INC.

RAPIDFAX NO.: (330) 477-2046

COPIES TO:

FROM: ED KARKALIK

TOTAL NUMBER OF PAGES 7 (including this cover letter)

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL BACK AS SOON AS POSSIBLE.

We are herewith transmitting the following:

DATE	NO.	DESCRIPTION
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11/13/97	2693	BEAVER LETTER EXPLANATION OF CONTINGENCIES (2pg)
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KEITH -

AT LONG LAST, HERE IS BEAVER'S PIECE OF THE "FINISH LAGOON NO. 1" PUZZLE. STAN HAS CONFUSED BASE BID ITEMS NOT YET COMPLETED WITH INCREMENTAL ITEMS AS WELL AS SOME OF THE CONTINGENCY PROVISIONS. HENCE, THE NEED FOR MY COVER LETTER.

NOT YET COMPLETELY RECONCILED, HERE IS A "SNAP SHOT" OF BEAVER'S CONTRACT STATUS TO DATE:

ITEM	UNIT COSTS	VOLUMES ORIGINAL	VOLUMES CURRENT	COST IMPACT
CLAY PURCHASED/PLACED	$42.25/cy	1088cy	1388cy	+$12,675.00
LAGOON #1 MATERIAL REM/STAB/PLAC	53.40/cy	600	300	−16,020.00
BIOCELL MAT'L STABILIZED	13.54/cy	3000	3205	+2,775.70
BIOCELL MAT'L PLACED	11.72/cy	3000	3205	+2,402.60
				+$1833.30

WE WILL FINISH AUDIT OF THESE ITEMS TOMORROW. THERE ARE OTHER ITEMS, NOT SIGNIFICANT BUT NEEDING ACCOUNTING, TO ALSO CONSIDER (I.E. ELECTRICAL FOR PUMP CHANGES, ETC.)

JOB NO. 731397.03000

02000C02

ED

CDF006749

PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119

11/14

PARESCL/1197/Dcc/EJK7-58

13 November 1997

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Completion of Lagoon No. 1 Re-Construction Project

Dear Keith:

Based on several discussions with Mr. Stan Evans, of The Beaver Excavating Company (Beaver), Parsons Engineering Science, Inc. (Parsons ES) understands that Beaver proposes that the following incremental items and associated costs are required for the completion of the Lagoon No. 1 re-construction project. These items and costs are based on the assumptions listed in the "Project Understanding" section of Parsons ES' proposal to Canton Drop Forge, Inc. (CDF), dated 12 November 1997.

In particular, after closer scrutiny and analysis of the current and projected (i.e., 2.5:1) slope cross-sections, Beaver has confirmed that the amount of additional soil required to achieve the desired slopes is 1,080 cubic yards (cu.yd.). We have also assumed that there are about 500 cu.yd of oil-impacted soil remaining in the bottom of the bio-cell, available for fill after treatment. As a consequence, Beaver's incremental scope items and costs are:

MAY

1. Mixing, treatment, loading, transporting, placing and compacting about 500 cu yd. of oil-impacted and stabilized soil from the bio-cell area into Lagoon No. 1, based on unit prices of $13.54 and 11.72 per cu yd. for mixing/treating and for the balance of the activities, respectively (in accordance with the terms and conditions of CDF's contract with Beaver, dated 21 August 1997).

   $12,630

2. Borrowing (after screening for results of TCLP and compressive strength analyses), loading, transporting, placing and compacting about 580 cu yd. of clean fill from an off-site borrow area located nearby, at a unit price of $12.72 per cu yd.

   INCLUDES $1/cu yd

   $7,378

3. General conditions (already covered in original contract). **$0**

4. Probable contingencies [including costs for: extensive (i.e., repeated) pumping of water from Lagoon No. 1; de-water (through addition of stock-piled admixtures); stripping and stock-piling the top layer due to moisture or frost; purchasing and adding Portland cement or incremental volumes of fly ash and lime, if required].

   $2,000

5. Performance bond (already covered in original contract). **$0**

TOTAL INCREMENTAL COSTS **$22,008**

\+ 5990

27,998

PARSONS

CDF006750

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
13 November 1997
Page 2- Dee/EJK7-58

A copy of Beaver's proposal for these items is attached. Mr. Evans and I are prepared to discuss our respective proposals for incremental scope items and costs for completing this project with you at your earliest convenience. Beaver is recommending that, in order to avoid unnecessary delays and other adverse impacts due to impending weather conditions (i.e., frost, precipitation), the pumping of water from Lagoon No. 1 and stock-piling of oil-impacted soil in the bio-cell area be commenced at once. As discussed yesterday, the costs for the initial pumping of water from Lagoon No. 1 are already incorporated in Beaver's original contract. Since the volume of soil already removed from the bio-cell area appears to exceed the base amount contracted, the stock-piling of any additional oil-impacted soil represents a scope increase and an incremental cost.

Most sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Ed Karkalik

Edward J. Karkalik, PE
Project Manager

EJK/dee
cc: Mr. Stan Evans - The Beaver Excavating Company
Mr. Wilson H. Rownd, PE - Parsons ES
CMB (File 73139703000)

2(b)
3

THE BEAVER EXCAVATING COMPANY

November 13, 1997

Parson's Engineering Science
19101 Villaview Road, Suite 301
Cleveland, Ohio 44119

Attention: Ed Karkalik

Reference: Lagoon #1 Reconstruction
Our File #2693

Gentlemen:

Pursuant to your request and direction, we propose the following approximate quantities for completion of Lagoon #1 at 2 ½ : 1 side slopes:

Total to complete at 2 ½ : 1 slope (approximate)	1,780 cy + 10%	=1,960 cy.
12" clay layer (approximate)	400 cy + 10%	= (440 cy.)
6" clay layer (approximate)	400 cy + 10%	= (440 cy.)
General fill to 2 ½ : 1 slope (approximate)		= 1,080 cy.

Item # 2	Performance Bond (1%)		$ (-0-)
Item # 3	Mobilization/Demobilization (General conditions)		$(No Increase at this time)
Item #10	Oil impacted soil shredding, screening & stabilization	1,080 cy @ $13.54	$14,623.20
Item #11	Lower & upper clay layer placement & compacting		
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Item #12	Stabilized soil placement & compacting	1,080 cy @ $11.72	$12,657.00

Note: We have 2 outside sources available for fill material.
We are presently having TCLP tests done on the closest source.

If material has to be hauled in from offsite in lieu of coming from the biocell we request the following additional charge to Item #12.
Source #1 if approved add $1.00/cy.
Source #2 if approved add $4.00/cy.
If neither source is approved then additional costs will need to be reviewed at a later date.

Parson's Engineering Science
Attn: Ed Karkalik
November 13, 1997
Page -2-

Item # ( )	Winter & weather contingencies: Such as, major dewatering, frost excavation, stripping of mud, add mixture conditioning to stabilize soils, any weather or delay related corrective measures etc., will be paid for on a time & material basis. Assume \$500.00 - \$2,000.00 probable cost but escalate to \$10,000.00 to allow sufficient budget.	\$10,000.00
	Budget Total for the Scope of This Letter	\$74,460.20

All items to be in accordance with our original contract dated 8/21/97 (Section 00500, Form of Agreement).

If you have any questions please feel free to contact our office.

Thank You,

BEAVER EXCAVATING CO.

Stanley R. Evans
Project Manager

SRE:lf

EU

2(b)
3

THE BEAVER EXCAVATING COMPANY

4650 SOUTHWAY S. W.
P.O. BOX 6059
CANTON, OHIO 44706
(330) 478-2151

FAX NUMBER (330) 478-2122

DATE: 11-13-97

NUMBER OF PAGES BEING SENT 8 INCLUDING THIS ONE.

TO: ED KARKALIK

COMPANY: PARSON'S ENG. SCIENCE

FROM: STAN EVANS

( ) THE ORIGINAL OF THIS TRANSMITTAL WILL BE SENT BY:
( ) REGULAR MAIL ( ) OVERNIGHT MAIL

(X) THIS WILL BE THE ONLY FORM OF DELIVERY OF THIS TRANSMITTAL

RE: DEDUCT 12" CLAY LAYER ONLY
FROM QUANTITY 1780 CY
+10% 180 CY
1960 CY
- 440 CY (12" layer)
1520 CY. FILL
- 440 CY (6" layer)
FULL SIZE TO FOLLOW. 1080 CY.

IF YOU DO NOT RECEIVE ANY OF THESE PAGES, PLEASE CONTACT US AT (330) 478-2151 AS SOON AS POSSIBLE.

THANK YOU

STAN EVANS

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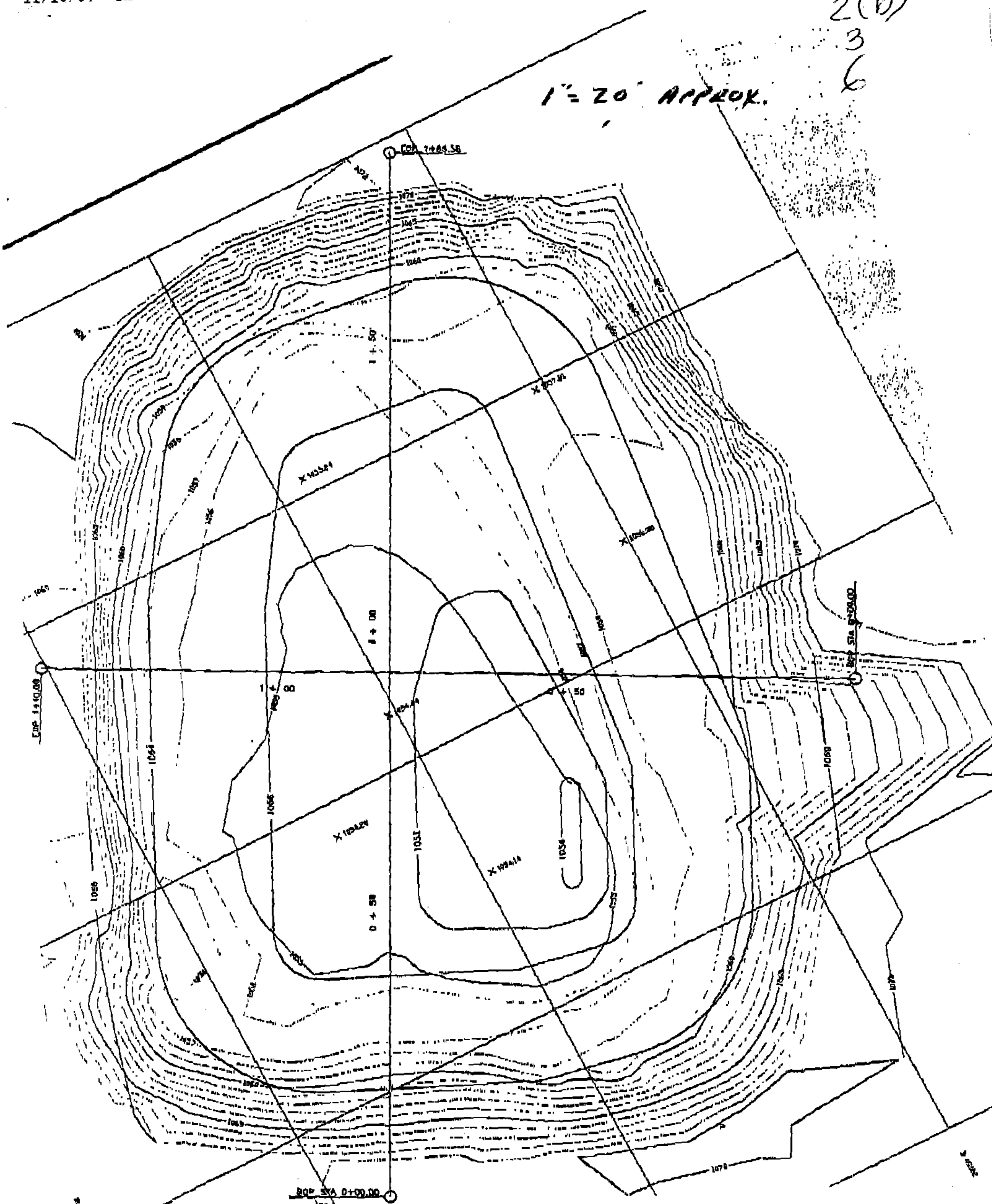

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CANTON DROP FORGE, INC.
ENVIRONMENTAL ISSUES DISCUSSION
CONFERENCE CALL
14 NOVEMBER 1997

TOPICS FOR DISCUSSION

LAGOON # 1

A. GENERAL

OVERALL STATUS OF PROJECTS
- LAGOON NO. 1 COMPLETION — REACH UNDERSTANDING - DECISION BY CLOSE OF SHIFT + BAD WEATHER PARSON ECRAVEN + CATCH BASINS

B. LAGOON NO. 2

SUMMARY OF RESULTS OF ANALYSES — ENOUGH INFO TO MAKE DECISION NO TIME CONSTRAINT
REGULATORY ISSUES
TIMING ISSUES — TANK ~~REMOVAL~~ RETAIN

LAGOON # 3

C. PROPOSED ODOT SEWER LINE — PLAN FOR FUTURE

VAP INITIATION
LETTER KEITH TO ODOT
ODOT BORINGS

VAP APPLICABILITY
- TIMING ISSUES — ORDER OF EVENTS
- OTHER REGULATIONS
- SCOPE/PARCEL(S)

INVESTIGATION/ASSESSMENT
- PHASE I
- GEOPROBE®
- GEOPHYSICAL

D. CLOSURE

Post-It® Fax Note 7671	Date 11/14	# of pages ▶ 1
To Keith Housekneckt	From Ed K.	
Co./Dept.	Co.	
Phone #	Phone #	
Fax #	Fax #	

How does this look?

Canton Drop Forge, Inc.

Environmental Projects Status
as of September 26, 1997

Canton Drop Forge, Inc. Authorizations			Parsons Engineering Science, Inc. Implementation/Status		
P.O. Number	Description	Amount	WBS	Status of Work	Amount Spent
98072	Lagoon #1 / Biocell Study	$17,909	731397-01000	Complete, minor ODCs pending.	$17,058
98867	Lagoon #1 Sewers	$1,600	731397-02000	Complete, closed.	$1,600
98575	Lagoon #1 Design/Construction	$26,927	731397-03000	Construction underway; 90% complete overall.	$23,353
98757-1	Lagoon #1 Contract Negotiation	$2,867	731397-03000	Complete.	$2,867
Pending	Lagoon #1 Add'l Constr'n Observation	$1,000	731397-03002	Pending progress within original authorization.	$0
98576	Lagoon #2 Sampling	$14,317	731397-04000	Complete, lab invoices pending.	$6,377
98622	Lagoon #2 Bypass Pre-Design	$2,600	731397-05000	Report issued; complete, closed.	$2,600
	Subtotal	**$67,220**		Subtotal	**$53,855**
98252	Condensate Sampling	$7,000	731549-01000	Complete, minor ODCs pending.	$6,693
98623	Condensate Testing	$6,600	731549-02000	Complete, closed.	$6,600
	Subtotal	**$13,600**		Subtotal	**$13,293**
	TOTAL	**$80,820**		**TOTAL**	**$67,148**

CDF006757

2(b)3

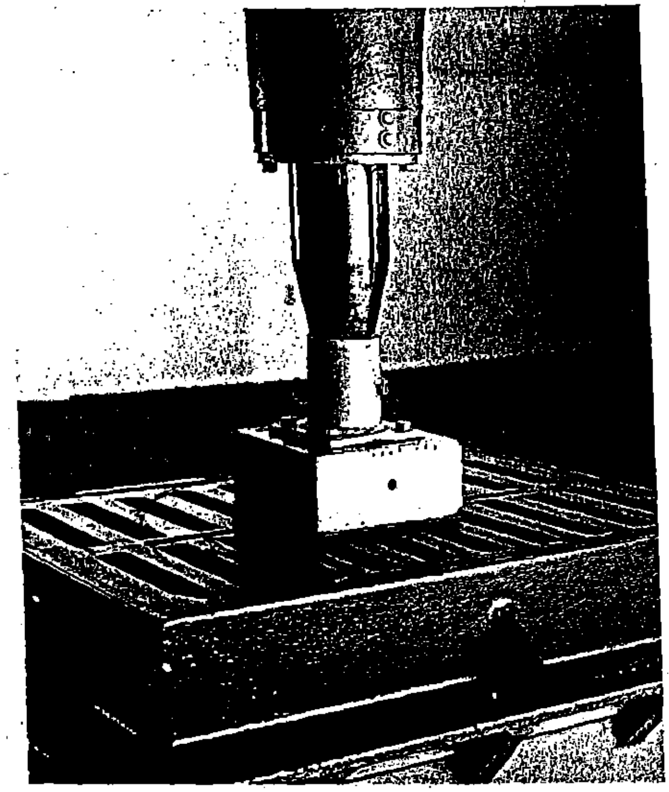
PROOF LOAD TESTING

Proof load tests at EJIW/VFC are performed in accordance with the latest revision of Federal Specification RR-F-621. For highway traffic service this test is described as 25,000 lb. load concentrated on a 9" x 9" area placed in the center of the grate or cover and held for one minute. Following the test the casting is carefully inspected. Any crack or permanent deformation will cause the casting to be rejected. Many EJIW castings are tested far beyond the specified proof load, often to destruction. East Jordan Iron Works, Inc. maintains a load bearing testing machine and has been actively testing street castings for many years.

ADVANTAGES OF GRAY AND DUCTILE IRON

Gray iron has an unequaled record of success as a material for construction and utility castings. Engineers and design professionals specify gray iron for its many outstanding properties. Gray iron is highly resistant to corrosion, maintains compressive strength, abrasion resistance, vibration absorption, and low-notch sensitivity. It also allows a great deal of design freedom, as illustrated in the following pages of this catalog. Gray iron combines all these features, has a long service life, and is also very cost effective. EJIW manufactures gray iron street castings in accordance with ASTM A48.

Ductile iron combines the advantages of gray iron with greater strength, toughness, and impact resistance. Because it has the ability to withstand greater loads without failure, it is often specified for extra-heavy load applications. EJIW supplies ductile iron in accordance with ASTM A536.



SERVICE LOAD DESIGNATION

Light, heavy, and extra heavy duty designations are assigned to EJIW castings to reflect load ratings. The most widely accepted criteria for highway traffic loading comes from "Standard Specifications for Highway Bridges" published by AASHTO (American Association of State Highway and Transportation Officials). This specification defines the H20 loading condition as a two axle truck, and the HS20 loading condition as a tractor truck with a tandem axle semi trailer. In both loading cases the maximum axle load is 32,000 pounds, or 16,000 pounds for each set of dual wheels. All EJIW castings designated as heavy duty are designed to meet or exceed this loading criteria.

EJIW sales and engineering personnel are available for consultation to ensure that properly designed products are provided to meet project specifications. Do not use light duty castings for a heavy duty application! Involve EJIW personnel if you are in doubt of your design requirements.

COATING OF CONSTRUCTION CASTINGS

Most Municipal Authorities and Consulting Engineers specify that gray and ductile iron castings used for utility construction shall be coated with asphaltic paint. In some cases a minimum mill-thickness for the coating is specified. To meet this customer requirement, East Jordan Iron Works, Inc. has installed a modern casting coating facility.

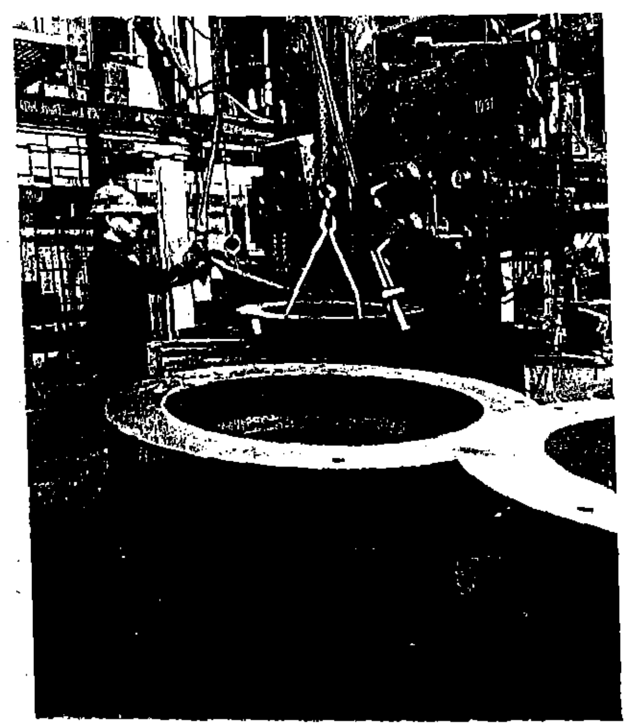
Castings are coated on-line immediately after cleaning and machining. Each casting passes through a pre-heat oven which provides proper casting temperature prior to passing through the coating tank. Precise monitoring of the coating formulation and casting inspection assures that coating quality and consistency is maintained.

Unless otherwise specified by the customer, all East Jordan construction castings are coated with a water base asphalt paint. This material is a nontoxic, nonflammable, and odorless asphalt emulsion that dries to a hard, black gloss finish. Unlike asphalt varnishes and cutbacks which are thinned with petroleum distillates such as naphtha, this asphalt emulsion is thinned with water for our application process. East Jordan Iron Works Inc., can provide construction castings with a premium protective asphalt coating which is environmentally safe.

This same asphalt coating meets the requirements of AWWA C104 for interior coating of pipes in potable water systems.

MACHINED BEARING SURFACES

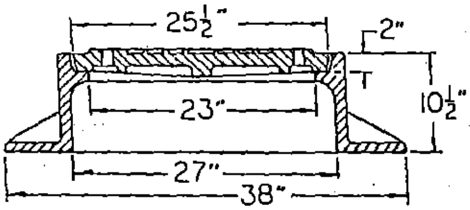
Machined bearing surfaces are standard on many East Jordan Iron Works, Inc. construction and utility castings. Accurately machined bearing surfaces eliminate rocking caused by uneven seating surfaces. This feature is in accordance with section 3.101.1 of Federal Specification RR-F-621. "Frames, Covers, Grating, Steps, Sump and Catch Basins, Manholes."

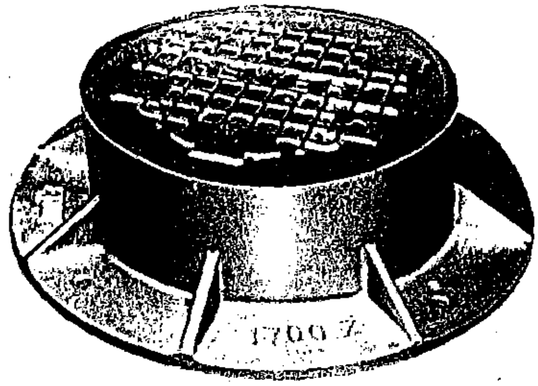


Heavy Duty

1700 *(Specify type cover or grate)*

Machined bearing surfaces





Type Cover	Total Wt. (lbs.)	Type Grate	Total Wt. (lbs.)
B Perforated	560	M Flat	560

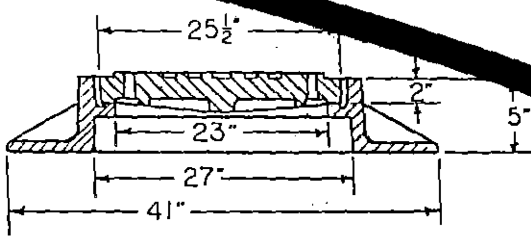
OPTIONS: Solid, vented, & gasket seal covers

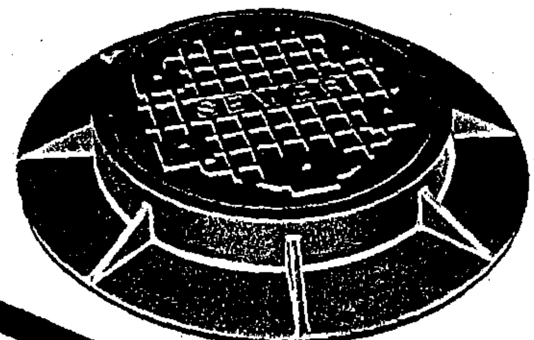
Type M
Flat Grate
Approx. 120 sq. in. of opening

Heavy Duty

1703 *(Specify type cover or grate)*

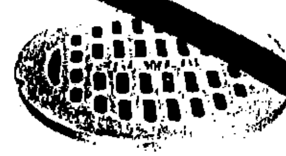
Machined bearing surfaces





Type Cover	Total Wt. (lbs.)	Type Grate	Total Wt. (lbs.)
B Perforated	475	M Flat	475

OPTIONS: Solid or vented covers



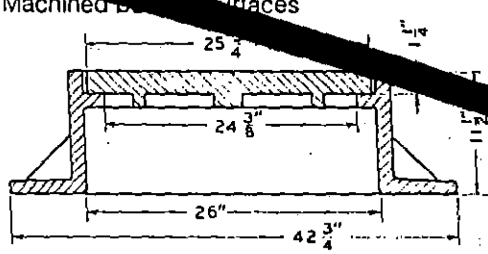
Type M
Flat Grate
Approx. 120 sq. in. of opening

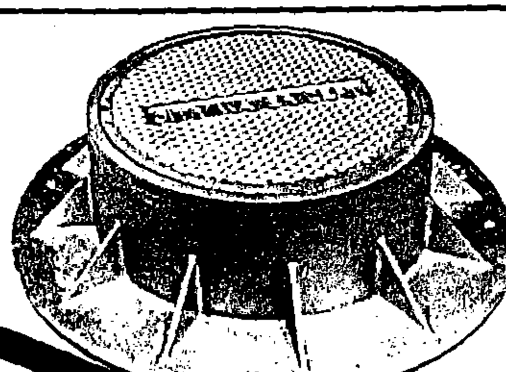
Heavy Duty

1705 *(Specify type cover or grate)*

Machined bearing surfaces

Type P
Concave Grate
Depth of concave ¾"
Approx. 120 sq. in.
of opening





Type Cover	Total Wt. (lbs.)	Type Grate	Total Wt. (lbs.)
A Solid	600	P Concave	585
E Ring	610		

OPTIONS: 2 piece type E cover – inner cover 9¼" diameter – ring cover has 8" diameter access opening

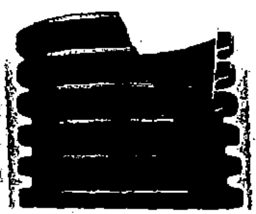
CDF006760

Hancor®
SureLok®
A Self-Locking Hi-Q® Pipe System

Sure-Lok® pipe is designed with a corrugated exterior and smooth interior for optimal strength. Backfilled with the same material required for any typical drainage installation, Sure-Lok pipe can withstand highway traffic loads with just 1' (0.3 m) of cover and deep fills up to 20' (6 m) or more. In addition, Hancor area engineers and application engineers can provide backfill recommendations to permit even deeper burials.

- Withstands highway traffic loads with only 1' (0.3 m) of cover.
- Strong enough to withstand fills up to 20' (6 m) deep or more.
- Backfill requirements for Sure-Lok are the same as for other quality pipe installations.

Superior Hydraulics



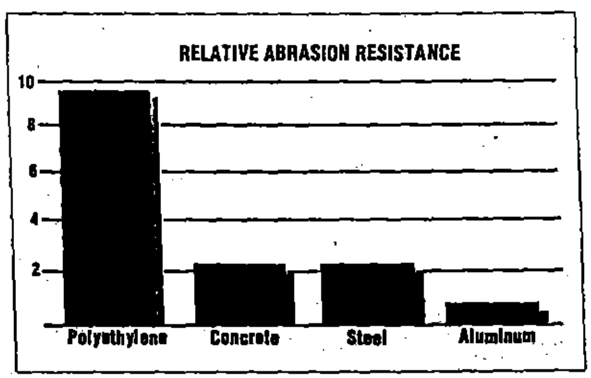
Superior hydraulics mean you can often downsize your piping network from what is required for other materials. Sure-Lok pipe offers 30% to 50% more capacity than corrugated steel, aluminum or reinforced concrete pipe. Independent laboratory testing has demonstrated a conservative design Manning's "n" value of 0.010.

- Improves long-term hydraulic efficiency.
- Won't snag debris or encourage sediment even on shallow grades.
- Pipe systems can be downsized, reducing material and installation costs.

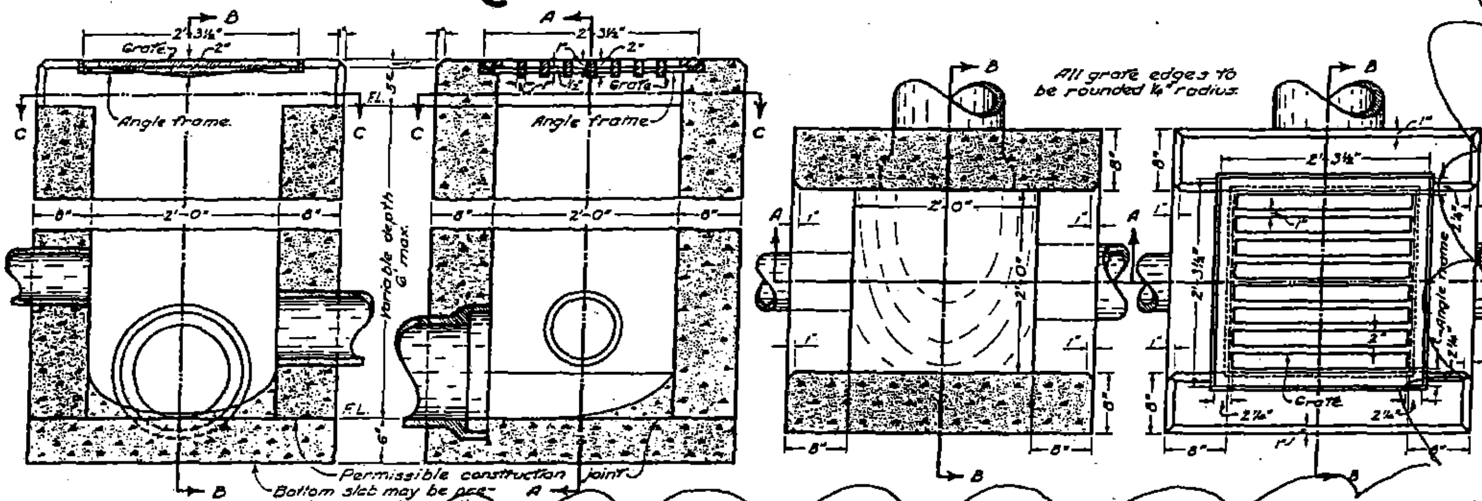
Excellent Durability

High density polyethylene (HDPE) pipe has proven itself to be one of the most durable materials available for stormwater drainage products. HDPE resists aggressive chemicals such as road salts, motor oils and fuels. Sure-Lok pipe won't rust, deteriorate or crumble. HDPE is over three times as abrasion-resistant as concrete and steel, and exceeds aluminum's abrasion resistance by a factor of 10.

- Resists aggressive chemicals such as road salts, motor oils and fuels.
- Unaffected by extremes in pH.
- Withstands repeated freeze-thaw cycles and continuous subzero temperatures.
- Won't rust, deteriorate or crumble.
- Highly abrasion-resistant.

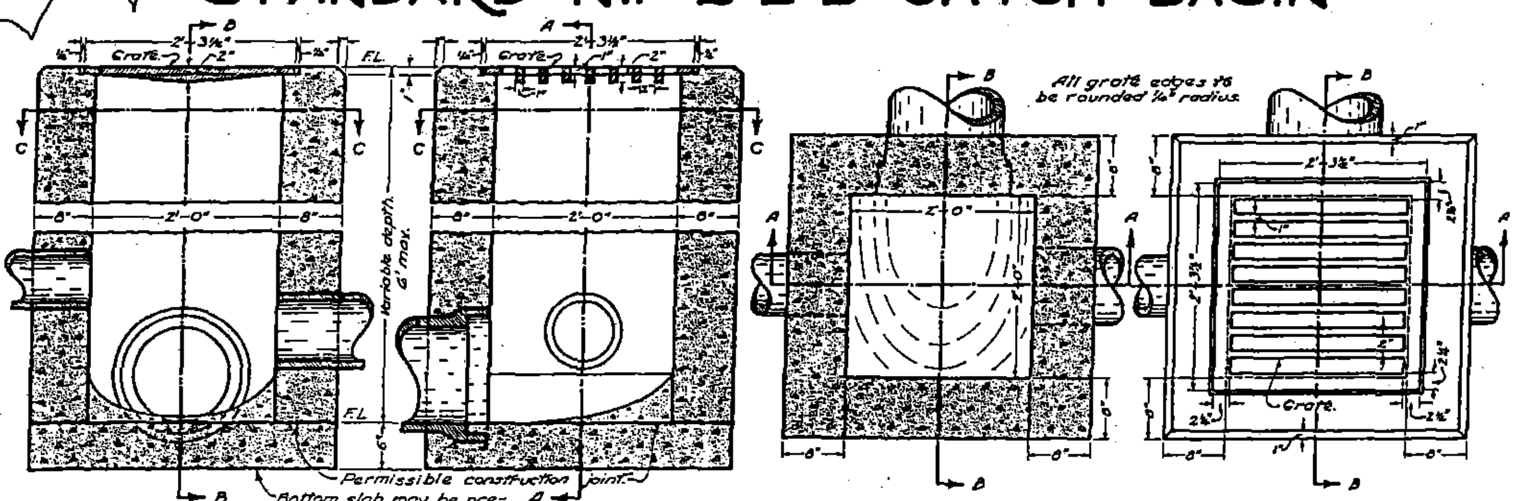


STANDARD Nº 2-2-A CATCH BASIN



SECTION A-A SECTION B-B SECTION C-C PLAN

STANDARD Nº 2-2-B CATCH BASIN



SECTION A-A SECTION B-B SECTION C-C PLAN

LOCATION and elevation when given on the plans is top center of the grate. When side openings are provided, elevation shall be the ... line of the side inlet.

GRATING AND FRAME – The design shall be essentially the same and equally as strong as the one shown hereon.

Weight of grate, minimum, 120 lb.
Weight of frame, minimum, 40 lb.

BRICK, concrete block or cast-in-p... walls have a nominal thickness of ... inches. Precast walls shall have a minimum thickness of 6 inches and reinforced sufficiently to permit shipping and handling without damage. Brick or concrete block shall not be used above the flow l... of the side opening for type 2-2-...

2-2-A SIDE INLETS to be placed 4 to 6 inches below normal elevation of median or ditch flow line returning to normal 10 feet each side of basin.

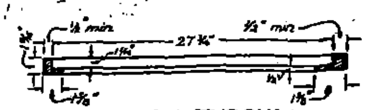
2-2-B GRATE elevation to b... placed 4 to 6 inches below norma... ditch returning to normal 10 feet each side of basin.

SIDE INLETS shall be provided on both sides of the Nº 2-2-A catch basin in sags and on upstream side only where the ditch has a continuous down grade past the catch basin.

CONCRETE, cast-in-place, to be ... Class C. All precast concrete shall meet the requirements of 706.13 with 6 ±2% air void content in the hardened concrete and be marked with catch basin number.

OPENINGS for pipes shall be O.D. +2" when fabricated or field cut.

REENFORCING – #5 REBAR
6' CENTERS, EW



SECTION THROUGH ANGLE FRAME
FOR
STANDARD Nº 2-2-A CATCH BASINS

BUREAU OF LOCATION AND DESIG...
OHIO DEPARTMENT OF TRANSPORTATI...

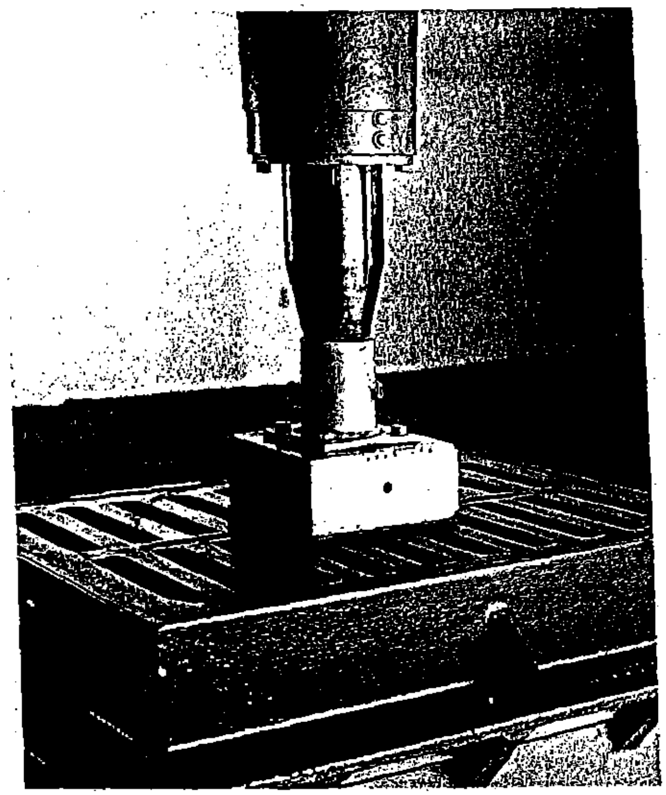
CATCH BASINS

STANDARD CONSTRUCTION DRAWING CB-2-2-A & B

APPROVED [signature] ENGR L & D.

PROOF LOAD TESTING

Proof load tests at EJIW/VFC are performed in accordance with the latest revision of Federal Specification RR-F-621. For highway traffic service this test is described as 25,000 lb. load concentrated on a 9" x 9" area placed in the center of the grate or cover and held for one minute. Following the test the casting is carefully inspected. Any crack or permanent deformation will cause the casting to be rejected. Many EJIW castings are tested far beyond the specified proof load, often to destruction. East Jordan Iron Works, Inc. maintains a load bearing testing machine and has been actively testing street castings for many years.



ADVANTAGES OF GRAY AND DUCTILE IRON

Gray iron has an unequaled record of success as a material for construction and utility castings. Engineers and design professionals specify gray iron for its many outstanding properties. Gray iron is highly resistant to corrosion, maintains compressive strength, abrasion resistance, vibration absorption, and low-notch sensitivity. It also allows a great deal of design freedom, as illustrated in the following pages of this catalog. Gray iron combines all these features, has a long service life, and is also very cost effective. EJIW manufactures gray iron street castings in accordance with ASTM A48.

Ductile iron combines the advantages of gray iron with greater strength, toughness, and impact resistance. Because it has the ability to withstand greater loads without failure, it is often specified for extra-heavy load applications. EJIW supplies ductile iron in accordance with ASTM A536.

SERVICE LOAD DESIGNATION

Light, heavy, and extra heavy duty designations are assigned to EJIW castings to reflect load ratings. The most widely accepted criteria for highway traffic loading comes from "Standard Specifications for Highway Bridges" published by AASHTO (American Association of State Highway and Transportation Officials). This specification defines the H20 loading condition as a two axle truck, and the HS20 loading condition as a tractor truck with a tandem axle semi trailer. In both loading cases the maximum axle load is 32,000 pounds, or 16,000 pounds for each set of dual wheels. All EJIW castings designated as heavy duty are designed to meet or exceed this loading criteria.

EJIW sales and engineering personnel are available for consultation to ensure that properly designed products are provided to meet project specifications. Do not use light duty castings for a heavy duty application! Involve EJIW personnel if you are in doubt of your design requirements.

COATING OF CONSTRUCTION CASTINGS

Most Municipal Authorities and Consulting Engineers specify that gray and ductile iron castings used for utility construction shall be coated with asphaltic paint. In some cases a minimum mill-thickness for the coating is specified. To meet this customer requirement, East Jordan Iron Works, Inc. has installed a modern casting coating facility.

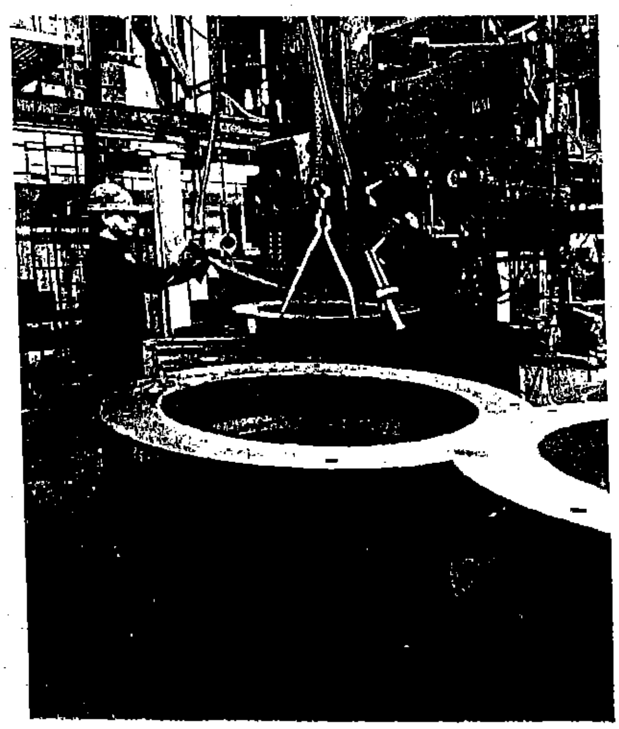
Castings are coated on-line immediately after cleaning and machining. Each casting passes through a pre-heat oven which provides proper casting temperature prior to passing through the coating tank. Precise monitoring of the coating formulation and casting inspection assures that coating quality and consistency is maintained.

Unless otherwise specified by the customer, all East Jordan construction castings are coated with a water base asphalt paint. This material is a nontoxic, nonflammable, and odorless asphalt emulsion that dries to a hard, black gloss finish. Unlike asphalt varnishes and cutbacks which are thinned with petroleum distillates such as naphtha, this asphalt emulsion is thinned with water for our application process. East Jordan Iron Works Inc., can provide construction castings with a premium protective asphalt coating which is environmentally safe.

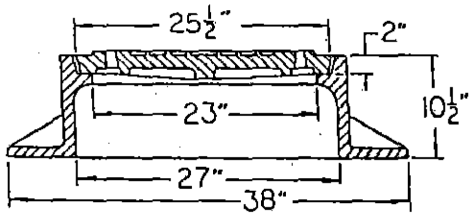
This same asphalt coating meets the requirements of AWWA C104 for interior coating of pipes in potable water systems.

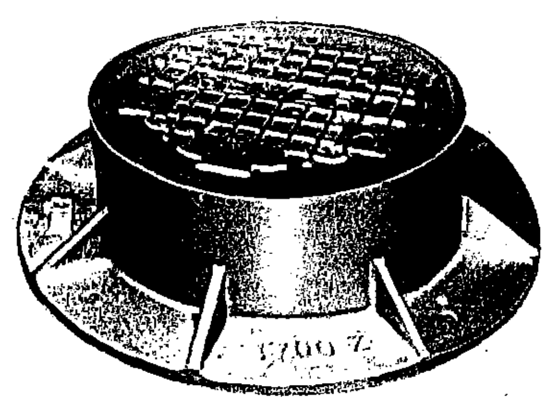
MACHINED BEARING SURFACES

Machined bearing surfaces are standard on many East Jordan Iron Works, Inc. construction and utility castings. Accurately machined bearing surfaces eliminate rocking caused by uneven seating surfaces. This feature is in accordance with section 3.101.1 of Federal Specification RR-F-621. "Frames, Covers, Grating, Steps, Sump and Catch Basins, Manholes."



Heavy Duty
1700 *(Specify type cover or grate)*
Machined bearing surfaces



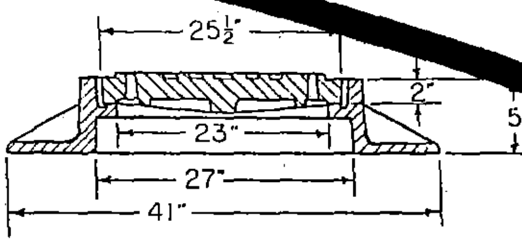


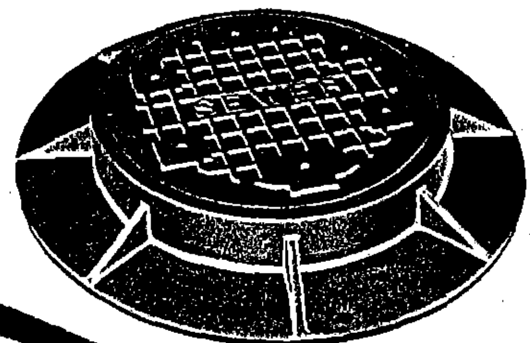
Type Cover	Total Wt. (lbs.)	Type Grate	Total Wt. (lbs.)
B Perforated	560	M Flat	560

OPTIONS: Solid, vented, & gasket seal covers

Type M
Flat Grate
Approx. 120 sq. in. of opening

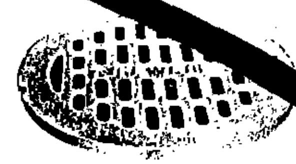
Heavy Duty
1703 *(Specify type cover or grate)*
Machined bearing surfaces





Type Cover	Total Wt. (lbs.)	Type Grate	Total Wt. (lbs.)
B Perforated	475	M Flat	475

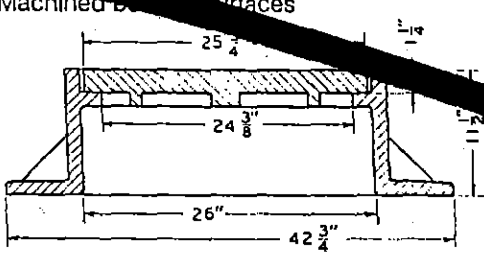
OPTIONS: Solid or vented covers

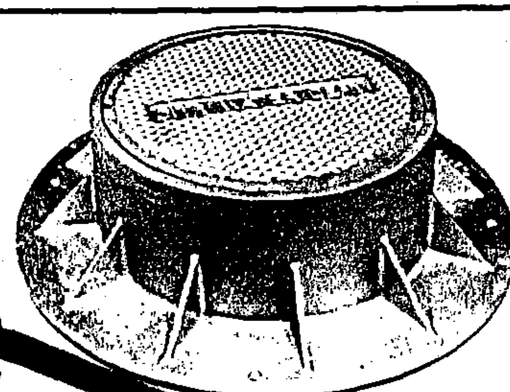


Type M
Flat Grate
Approx. 120 sq. in. of opening

Heavy Duty
1705 *(Specify type cover or grate)*
Machined bearing surfaces

Type P
Concave Grate
Depth of concave ¾"
Approx. 120 sq. in.
of opening





Type Cover	Total Wt. (lbs.)	Type Grate	Total Wt. (lbs.)
A Solid	600	P Concave	585
E Ring	610		

OPTIONS: 2 piece type E cover – inner cover 9¼" diameter – ring cover has 8" diameter access opening

Hancor®

SureLok®

A Self-Locking Hi-Q® Pipe System

CDF006767

Engineered Strength

Sure-Lok® pipe is designed with a corrugated exterior and smooth interior for optimal strength. Backfilled with the same material required for any typical drainage installation, Sure-Lok pipe can withstand highway traffic loads with just 1' (0.3 m) of cover and deep fills up to 20' (6 m) or more. In addition, Hancor area engineers and application engineers can provide backfill recommendations to permit even deeper burials.

- Withstands highway traffic loads with only 1' (0.3 m) of cover.
- Strong enough to withstand fills up to 20' (6 m) deep or more.
- Backfill requirements for Sure-Lok are the same as for other quality pipe installations.

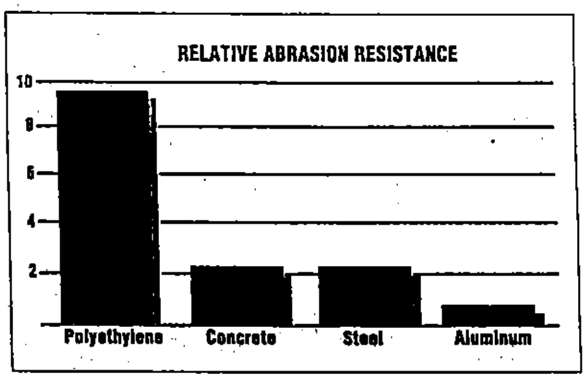
Superior Hydraulics

Superior hydraulics mean you can often downsize your piping network from what is required for other materials. Sure-Lok pipe offers 30% to 50% more capacity than corrugated steel, aluminum or reinforced concrete pipe. Independent laboratory testing has demonstrated a conservative design Manning's "n" value of 0.010.

- Improves long-term hydraulic efficiency.
- Won't snag debris or encourage sediment even on shallow grades.
- Pipe systems can be downsized, reducing material and installation costs.

Excellent Durability

High density polyethylene (HDPE) pipe has proven itself to be one of the most durable materials available for stormwater drainage products. HDPE resists aggressive chemicals such as road salts, motor oils and fuels. Sure-Lok pipe won't rust, deteriorate or crumble. HDPE is over three times as abrasion-resistant as concrete and steel, and exceeds aluminum's abrasion resistance by a factor of 10.



- Resists aggressive chemicals such as road salts, motor oils and fuels.
- Unaffected by extremes in pH.
- Withstands repeated freeze-thaw cycles and continuous subzero temperatures.
- Won't rust, deteriorate or crumble.
- Highly abrasion-resistant.

CDF006768

Canton Drop Forge, Inc.

Environmental Projects Status
as of October 31, 1997

Canton Drop Forge, Inc. Authorizations			Parsons Engineering Science, Inc. Implementation/Status		
P.O. Number	Description	Amount	WBS	Status of Work	Amount Spent
98072	Lagoon #1 / Biocell Study	$17,909	731397-01000	Complete, closed.	$17,340
98867	Lagoon #1 Sewers	$1,600	731397-02000	Complete, closed.	$1,600
98575	Lagoon #1 Design/Construction	$26,927	731397-03000	Construction suspended, pending approval of revised plan.	$26,446
98575-1	Lagoon #1 Contract Negotiation	$2,867	731397-03000	Complete.	$2,867
Pending	Lagoon #1 Add'l Constr'n Observ'n	$0	731397-03002	Pending approval of revised plan.	$0
98576	Lagoon #2 Sampling	$14,317	731397-04000	Complete, closed.	$14,317
98622	Lagoon #2 Bypass Pre-Design	$2,600	731397-05000	Complete, closed.	$2,600
	Subtotal	$66,220		Subtotal	$65,170
98252	Condensate Sampling	$7,000	731549-01000	Complete, closed.	$6,711
98623	Condensate Testing	$6,600	731549-02000	Complete, closed.	$6,600
	Subtotal	$13,600		Subtotal	$13,311
	TOTAL	$79,820		TOTAL	$78,481

Post-it® Fax Note 7671
To Keith Hoskinech
Co./Dept.
Phone #
Fax #
Date 11/12
\# of pages ▶ 1
From Ed K
Co.
Phone #
Fax #

2(b)
3

CDF006769

001

PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119
PARESCL/1197/Dee/EJK7-58

13 November 1997

2(b)
3

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Completion of Lagoon No. 1 Re-Construction Project

Dear Keith:

Based on several discussions with Mr. Stan Evans, of The Beaver Excavating Company (Beaver), Parsons Engineering Science, Inc. (Parsons ES) understands that Beaver proposes that the following incremental items and associated costs are required for the completion of the Lagoon No. 1 re-construction project. These items and costs are based on the assumptions listed in the "Project Understanding" section of Parsons ES' proposal to Canton Drop Forge, Inc. (CDF), dated 12 November 1997.

In particular, after closer scrutiny and analysis of the current and projected (i.e., 2.5:1) slope cross-sections, Beaver has confirmed that the amount of additional soil required to achieve the desired slopes is 1,080 cubic yards (cu.yd.). We have also assumed that there are about 500 cu.yd of oil-impacted soil remaining in the bottom of the bio-cell, available for fill after treatment. As a consequence, Beaver's incremental scope items and costs are:

1. Mixing, treatment, loading, transporting, placing and compacting about 500 cu yd. of oil-impacted and stabilized soil from the bio-cell area into Lagoon No. 1, based on unit prices of $13.54 and 11.72 per cu yd. for mixing/treating and for the balance of the activities, respectively (in accordance with the terms and conditions of CDF's contract with Beaver, dated 21 August 1997).

   $12,630

2. Borrowing (after screening for results of TCLP and compressive strength analyses), loading, transporting, placing and compacting about 580 cu yd. of clean fill from an off-site borrow area located nearby, at a unit price of $12.72 per cu yd.

   $7,378

3. General conditions (already covered in original contract). **$0**

4. Probable contingencies [including costs for: extensive (i.e., repeated) pumping of water from Lagoon No. 1; de-water (through addition of stock-piled admixtures); stripping and stock-piling the top layer due to moisture or frost; purchasing and adding Portland cement or incremental volumes of fly ash and lime, if required].

   $2,000

5. Performance bond (already covered in original contract). **$0**

TOTAL INCREMENTAL COSTS **$22,008**

2(b)
3

PARSONS ENGINEERING SCIENCE, INC.

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

DATE: 11/13/97

TO: MR. KEITH HOUSEKNECHT
LOCATION: CANTON DROP FORGE, INC.
RAPIDFAX NO.: (330) 477-2046
COPIES TO:

FROM: ED KARKALIK

TOTAL NUMBER OF PAGES 7 (including this cover letter)

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL BACK AS SOON AS POSSIBLE.

We are herewith transmitting the following:

DATE	NO.	DESCRIPTION
11/13/97	EJK758	PARSONS ES' LETTER RE: BEAVER SCOPE CHANGES 2pg
11/13/97	2693	BEAVER LETTER EXPLANATION OF CONTINGENCIES (2pg)
11/13/97	—	FAX FROM BEAVER ESTIMATING VOLUME REQUIRED (2pg)

KEITH -

AT LONG LAST, HERE IS BEAVER'S PIECE OF THE "FINISH LAGOON NO. 1" PUZZLE. STAN HAS CONFUSED BASE BID ITEMS NOT YET COMPLETED WITH INCREMENTAL ITEMS AS WELL AS SOME OF THE CONTINGENCY PROVISIONS. HENCE, THE NEED FOR MY COVER LETTER.

NOT YET COMPLETELY RECONCILED, HERE IS A "SNAP SHOT" OF BEAVER'S CONTRACT STATUS TO DATE:

ITEM	UNIT COSTS	VOLUMES ORIGINAL	VOLUMES CURRENT	COST IMPACT
CLAY PURCHASED/PLACED	$42.25/cy	1088 cy	1388 cy	+$12,675.00
LAGOON #1 MATERIAL REM/STAB/PLAC	53.40/cy	600	300	−16,020.00
BIOCELL MAT'L STABILIZED	13.54/cy	3000	3205	+ 2,775.70
BIOCELL MAT'L PLACED	11.72/cy	3000	3205	+ 2,402.60
				+$1833.30

WE WILL FINISH AUDIT OF THESE ITEMS TOMORROW. THERE ARE OTHER ITEMS, NOT SIGNIFICANT BUT NEEDING ACCOUNTING, TO ALSO CONSIDER (I.E. ELECTRICAL FOR PUMP CHANGES, ETC.)

JOB NO. 731397.03000

ED

02000C02

CDF006771

BEAVER EXCAVATING COMPANY

THE BEAVER EXCAVATING COMPANY

November 13, 1997

2 (b)
3

Parson's Engineering Science
19101 Villaview Road, Suite 301
Cleveland, Ohio 44119

Attention: Ed Karkalik

Reference: Lagoon #1 Reconstruction
Our File #2693

Gentlemen:

Pursuant to your request and direction, we propose the following approximate quantities for completion of Lagoon #1 at 2 ½ : 1 side slopes:

Total to complete at 2 ½ : 1 slope (approximate)	1,780 cy + 10%	=1,960 cy.
12" clay layer (approximate)	400 cy + 10%	= (440 cy.)
6" clay layer (approximate)	400 cy + 10%	= (440 cy.)
General fill to 2 ½ : 1 slope (approximate)		= 1,080 cy.

Item # 2	Performance Bond (1%)		$ (-0-)
Item # 3	Mobilization/Demobilization (General conditions)		$(No Increase at this time)
Item #10	Oil impacted soil shredding, screening & stabilization	1,080 cy @ $13.54	$14,623.20
Item #11	Lower & upper clay layer placement & compacting		
	a.) 12" bottom layer	440 cy @ $42.25	$18,590.00
	b.) 6" top layer	440 cy @ $42.25	$18,590.00
Item #12	Stabilized soil placement & compacting	1,080 cy @ $11.72	$12,657.00

Note: We have 2 outside sources available for fill material.
We are presently having TCLP tests done on the closest source.

If material has to be hauled in from offsite in lieu of coming from the biocell we request the following additional charge to Item #12.

Source #1 if approved add $1.00/cy.
Source #2 if approved add $4.00/cy.

If neither source is approved then additional costs will need to be reviewed at a later date.

CDF006772

Item # ( )	Winter & weather contingencies: Such as, major dewatering, frost excavation, stripping of mud, add mixture conditioning to stabilize soils, any weather or delay related corrective measures etc., will be paid for on a time & material basis. Assume \$500.00 - \$2,000.00 probable cost but escalate to \$10,000.00 to allow sufficient budget.	\$10,000.00
	Budget Total for the Scope of This Letter	\$74,460.20

All items to be in accordance with our original contract dated 8/21/97 (Section 00500, Form of Agreement).

If you have any questions please feel free to contact our office.

Thank You,

BEAVER EXCAVATING CO.

Stanley R. Evans
Project Manager

SRE:lf

2(b)
3

THE BEAVER EXCAVATING COMPANY

4650 SOUTHWAY S. W.
P.O. BOX 6059
CANTON, OHIO 44706
(330) 478-2151

FAX NUMBER (330) 478-2122

DATE: 11-13-97

NUMBER OF PAGES BEING SENT 8 INCLUDING THIS ONE.

TO: ED KARKALIK

COMPANY: PARSON'S ENG. SCIENCE

FROM: STAN EVANS

( ) THE ORIGINAL OF THIS TRANSMITTAL WILL BE SENT BY:
( ) REGULAR MAIL ( ) OVERNIGHT MAIL

(X) THIS WILL BE THE ONLY FORM OF DELIVERY OF THIS TRANSMITTAL

RE: DEDUCT 12" CLAY LAYER ONLY

FROM QUANTITY 1780 CY
+10% 180 CY
1960 CY
- 440 CY (12" Layer)

1520 CY. FILL
- 440 CY (6" Layer)
1080 CY

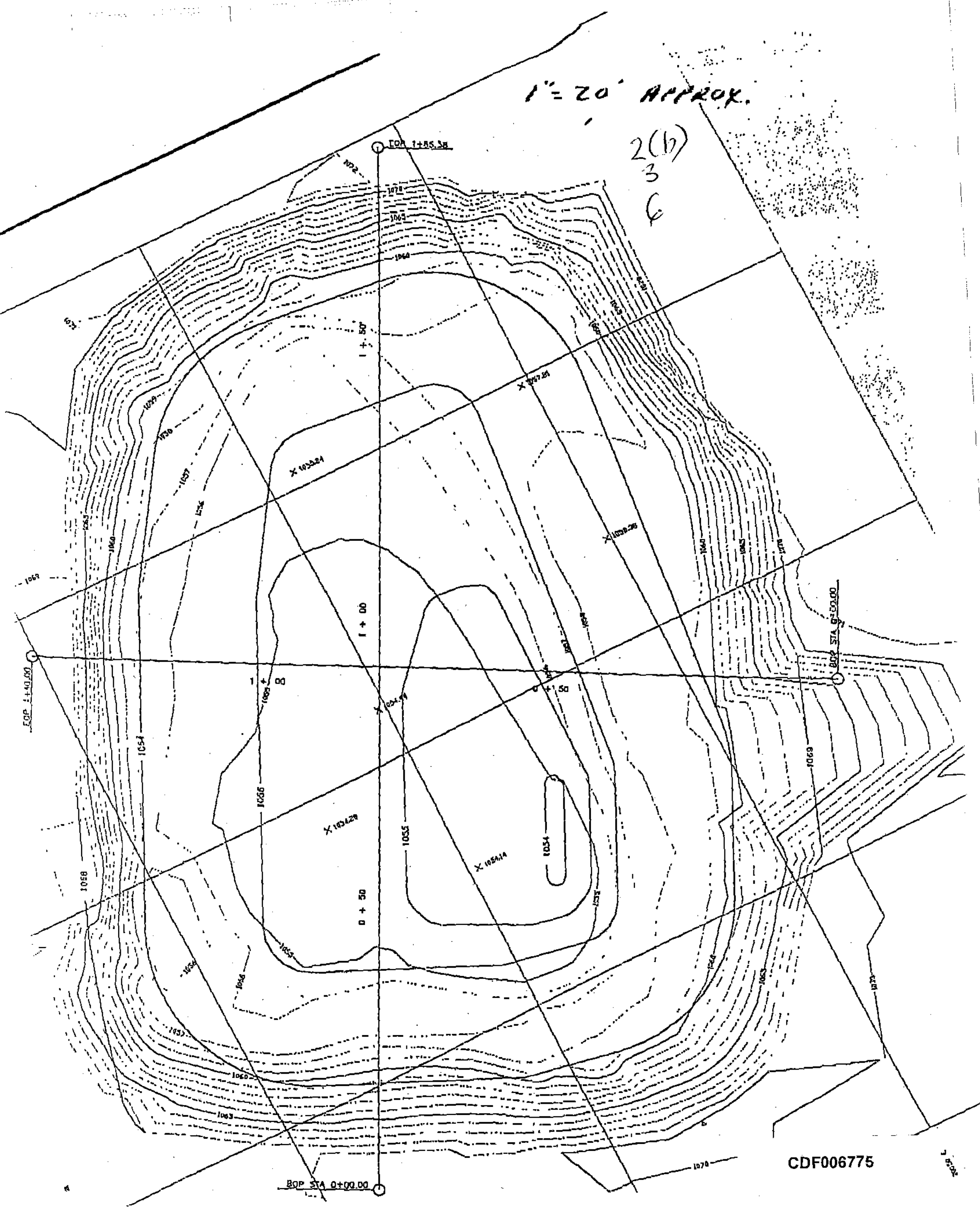
FULL SIZE TO FOLLOW.

IF YOU DO NOT RECEIVE ANY OF THESE PAGES, PLEASE CONTACT US AT (330) 478-2151 AS SOON AS POSSIBLE.

THANK YOU

STAN EVANS

CDF006774


1" = 20' APPROX.
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EOP 1+85.38
BOP STA 0+00.00
EOP 1+40.00
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PARSONS ENGINEERING SCIENCE, INC.

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

DATE: 11/13/97

TO: MR. KEITH HOUSEKNECHT
LOCATION: CANTON DROP FORGE, INC.
RAPIDFAX NO.: (330) 477-2046
COPIES TO:

FROM: ED KARKALIK

TOTAL NUMBER OF PAGES 7 (including this cover letter)

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL BACK AS SOON AS POSSIBLE.

We are herewith transmitting the following:

DATE	NO.	DESCRIPTION
11/13/97	EJK758	PARSONS ES' LETTER RE: BEAVER SCOPE CHANGES 2pg
11/13/97	2693	BEAVER LETTER EXPLANATION OF CONTINGENCIES (2pg)
11/13/97	—	FAX FROM BEAVER ESTIMATING VOLUME REQUIRED (2pg)

KEITH -

AT LONG LAST, HERE IS BEAVER'S PIECE OF THE "FINISH LAGOON NO. 1" PUZZLE. STAN HAS CONFUSED BASE BID ITEMS NOT YET COMPLETED WITH INCREMENTAL ITEMS AS WELL AS SOME OF THE CONTINGENCY PROVISIONS. HENCE, THE NEED FOR MY COVER LETTER.

NOT YET COMPLETELY RECONCILED, HERE IS A "SNAP SHOT" OF BEAVER'S CONTRACT STATUS TO DATE:

ITEM	UNIT COSTS	VOLUMES ORIGINAL	VOLUMES CURRENT	COST IMPACT
CLAY PURCHASED/PLACED	$42.25/cy	1088 cy	1388 cy	+$12,675.00
LAGOON #1 MATERIAL REM/STAB/PLAC	53.40/cy	600	300	−16,020.00
BIOCELL MAT'L STABILIZED	13.54/cy	3000	3205	+2,775.70
BIOCELL MAT'L PLACED	11.72/cy	3000	3205	+2,402.60
				+$1833.30

WE WILL FINISH AUDIT OF THESE ITEMS TOMORROW. THERE ARE OTHER ITEMS, NOT SIGNIFICANT BUT NEEDING ACCOUNTING, TO ALSO CONSIDER (I.E. ELECTRICAL FOR PUMP CHANGES, ETC.)

JOB NO. 731397.03000

ED

02000C02

2 (b)
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PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119
PARESCL/1197/Dcc/EJK7-58

13 November 1997

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Completion of Lagoon No. 1 Re-Construction Project

Dear Keith:

Based on several discussions with Mr. Stan Evans, of The Beaver Excavating Company (Beaver), Parsons Engineering Science, Inc. (Parsons ES) understands that Beaver proposes that the following incremental items and associated costs are required for the completion of the Lagoon No. 1 re-construction project. These items and costs are based on the assumptions listed in the "Project Understanding" section of Parsons ES' proposal to Canton Drop Forge, Inc. (CDF), dated 12 November 1997.

In particular, after closer scrutiny and analysis of the current and projected (i.e., 2.5:1) slope cross-sections, Beaver has confirmed that the amount of additional soil required to achieve the desired slopes is 1,080 cubic yards (cu.yd.). We have also assumed that there are about 500 cu.yd of oil-impacted soil remaining in the bottom of the bio-cell, available for fill after treatment. As a consequence, Beaver's incremental scope items and costs are: MAY

1. Mixing, treatment, loading, transporting, placing and compacting about 500 cu yd. of oil-impacted and stabilized soil from the bio-cell area into Lagoon No. 1, based on unit prices of $13.54 and 11.72 per cu yd. for mixing/treating and for the balance of the activities, respectively (in accordance with the terms and conditions of CDF's contract with Beaver, dated 21 August 1997). MATERIAL MUST BE REMOVED

   $12,630

2. Borrowing (after screening for results of TCLP and compressive strength analyses), loading, transporting, placing and compacting about 580 cu yd. of clean fill from an off-site borrow area located nearby, at a unit price of $12.72 per cu yd.

   INCLUDES $1/CUYD **$7,378**

3. General conditions (already covered in original contract). **$0**

4. Probable contingencies [including costs for: extensive (i.e., repeated) pumping of water from Lagoon No. 1; de-water (through addition of stock-piled admixtures); stripping and stock-piling the top layer due to moisture or frost; purchasing and adding Portland cement or incremental volumes of fly ash and lime, if required].

   $2,000

5. Performance bond (already covered in original contract). **$0**

TOTAL INCREMENTAL COSTS **$22,008**

\+ 5990
27,998
28,000

PARSONS

CDF006777

A copy of Beaver's proposal for these items is attached. Mr. Evans and I are prepared to discuss our respective proposals for incremental scope items and costs for completing this project with you at your earliest convenience. Beaver is recommending that, in order to avoid unnecessary delays and other adverse impacts due to impending weather conditions (i.e., frost, precipitation), the pumping of water from Lagoon No. 1 and stock-piling of oil-impacted soil in the bio-cell area be commenced at once. As discussed yesterday, the costs for the initial pumping of water from Lagoon No. 1 are already incorporated in Beaver's original contract. Since the volume of soil already removed from the bio-cell area appears to exceed the base amount contracted, the stock-piling of any additional oil-impacted soil represents a scope increase and an incremental cost.

Most sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Ed Karkalik

Edward J. Karkalik, PE
Project Manager

EJK/dee
cc: Mr. Stan Evans - The Beaver Excavating Company
Mr. Wilson H. Rownd, PE - Parsons ES
CMB (File 73139703000)

2(b)
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THE BEAVER EXCAVATING COMPANY

November 13, 1997

Parson's Engineering Science
19101 Villaview Road, Suite 301
Cleveland, Ohio 44119

Attention: Ed Karkalik

Reference: Lagoon #1 Reconstruction
Our File #2693

Gentlemen:

Pursuant to your request and direction, we propose the following approximate quantities for completion of Lagoon #1 at 2 ½ : 1 side slopes:

Total to complete at 2 ½ : 1 slope (approximate)	1,780 cy + 10%	=1,960 cy.
12" clay layer (approximate)	400 cy + 10%	= (440 cy.)
6" clay layer (approximate)	400 cy + 10%	= (440 cy.)
General fill to 2 ½ : 1 slope (approximate)		= 1,080 cy.

Item # 2	Performance Bond (1%)		$ (-0-)
Item # 3	Mobilization/Demobilization (General conditions)		$(No Increase at this time)
Item #10	Oil impacted soil shredding, screening & stabilization	1,080 cy @ $13.54	$14,623.20
Item #11	Lower & upper clay layer placement & compacting		
	a.) 12" bottom layer	440 cy @ $42.25	$18,590.00
	b.) 6" top layer	440 cy @ $42.25	$18,590.00
Item #12	Stabilized soil placement & compacting	1,080 cy @ $11.72	$12,657.00

Note: We have 2 outside sources available for fill material.
We are presently having TCLP tests done on the closest source.

If material has to be hauled in from offsite in lieu of coming from the biocell we request the following additional charge to Item #12.

Source #1 if approved add $1.00/cy.
Source #2 if approved add $4.00/cy.

If neither source is approved then additional costs will need to be reviewed at a later date.

CDF006779

Parson's Engineering Science
Attn: Ed Karkalik
November 13, 1997
Page -2-

Item # ( )	Winter & weather contingencies: Such as, major dewatering, frost excavation, stripping of mud, add mixture conditioning to stabilize soils, any weather or delay related corrective measures etc., will be paid for on a time & material basis. Assume $500.00 - $2,000.00 probable cost but escalate to $10,000.00 to allow sufficient budget.	$10,000.00
	Budget Total for the Scope of This Letter	$74,460.20

All items to be in accordance with our original contract dated 8/21/97 (Section 00500, Form of Agreement).

If you have any questions please feel free to contact our office.

Thank You,

BEAVER EXCAVATING CO.

Stanley R. Evans
Project Manager

SRE:lf

EU

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THE BEAVER EXCAVATING COMPANY

4650 SOUTHWAY S. W.
P.O. BOX 6059
CANTON, OHIO 44706
(330) 478-2151

FAX NUMBER (330) 478-2122

DATE: 11-13-97

NUMBER OF PAGES BEING SENT 8 INCLUDING THIS ONE.

TO: Ed Karkalik

COMPANY: Parson's Eng. Science

FROM: Stan Evans

( ) THE ORIGINAL OF THIS TRANSMITTAL WILL BE SENT BY:
( ) REGULAR MAIL ( ) OVERNIGHT MAIL

(X) THIS WILL BE THE ONLY FORM OF DELIVERY OF THIS TRANSMITTAL

RE: Deduct 12" clay layer only

From Quantity 1780 cy
+10% 180 cy
1960 cy
− 440 cy (12" layer)

1520 cy Fill
− 440 cy (6" layer)
Full size to follow. 1080 cy

IF YOU DO NOT RECEIVE ANY OF THESE PAGES, PLEASE CONTACT US AT (330) 478-2151 AS SOON AS POSSIBLE.

THANK YOU

Stan Evans

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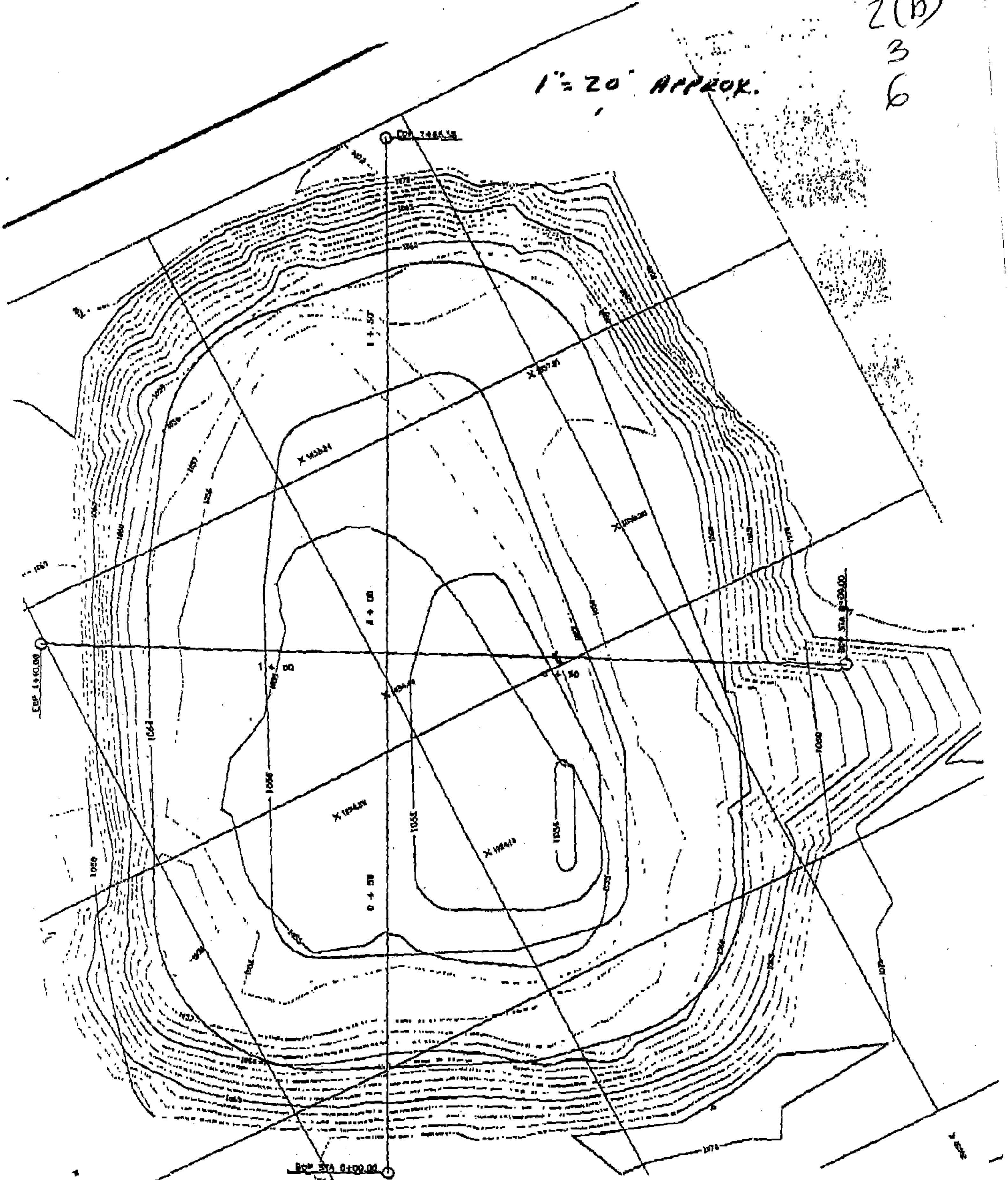
1" = 20' APPROX.



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CANTON DROP FORGE, INC.
ENVIRONMENTAL ISSUES DISCUSSION
CONFERENCE CALL
14 NOVEMBER 1997

TOPICS FOR DISCUSSION

LAGOON # 1

A. GENERAL

OVERALL STATUS OF PROJECTS
- LAGOON NO. 1 COMPLETION — REACH UNDERSTANDING - DECISION BY CLOSE OF SHIFT + BAD WEATHER PARSON BEAVER + CATCH BASINS

B. LAGOON NO. 2

SUMMARY OF RESULTS OF ANALYSES — ENOUGH INFO TO MAKE DECISION NO TIME CONSTRAINT
REGULATORY ISSUES
TIMING ISSUES — 20,000 TANK ~~REMOVAL~~ RETAIN

LAGOON # 3

C. PROPOSED ODOT SEWER LINE — PLAN FOR FUTURE

VAP INITIATION
LETTER KEITH TO ODOT
ODOT BORINGS

VAP APPLICABILITY
- TIMING ISSUES — ORDER OF EVENTS
- OTHER REGULATIONS
- SCOPE/PARCEL(S)

ODOT DISTRICT OFFICE

INVESTIGATION/ASSESSMENT
- PHASE I
- GEOPROBE®
- GEOPHYSICAL

D. CLOSURE

Post-it® Fax Note 7671	Date 11/14 # of pages ▶ 1
To Keith Housekneckt	From Ed K.
Co./Dept.	Co.
Phone #	Phone #
Fax #	Fax #

How does this look ?

Canton Drop Forge, Inc.

Environmental Projects Status
as of September 26, 1997

Canton Drop Forge, Inc. Authorizations			Parsons Engineering Science, Inc. Implementation/Status		
P.O. Number	Description	Amount	WBS	Status of Work	Amount Spent
98072	Lagoon #1 / Biocell Study	$17,909	731397-01000	Complete, minor ODCs pending.	$17,058
98867	Lagoon #1 Sewers	$1,600	731397-02000	Complete, closed.	$1,600
98575	Lagoon #1 Design/Construction	$26,927	731397-03000	Construction underway; 90% complete overall.	$23,353
98757-1	Lagoon #1 Contract Negotiation	$2,867	731397-03000	Complete.	$2,867
Pending	Lagoon #1 Add'l Constr'n Observation	$1,000	731397-03002	Pending progress within original authorization.	$0
98576	Lagoon #2 Sampling	$14,317	731397-04000	Complete, lab invoices pending.	$6,377
98622	Lagoon #2 Bypass Pre-Design	$2,600	731397-05000	Report issued; complete, closed.	$2,600
	Subtotal	**$67,220**		Subtotal	**$53,855**
98252	Condensate Sampling	$7,000	731549-01000	Complete, minor ODCs pending.	$6,693
98623	Condensate Testing	$6,600	731549-02000	Complete, closed.	$6,600
	Subtotal	**$13,600**		Subtotal	**$13,293**
	TOTAL	**$80,820**		**TOTAL**	**$67,148**

CDF006784

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PARSONS ENGINEERING SCIENCE, INC.

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

DATE: 11/5/97

TO: Keith Houseknecht

LOCATION: CDF

RAPIDFAX NO.: 330-477-2046

COPIES TO:

FROM: Ed Karkalik

TOTAL NUMBER OF PAGES 4 (including this cover letter)

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL BACK AS SOON AS POSSIBLE.

We are herewith transmitting the following:

DATE	NO.	DESCRIPTION
11/5/97		Cost estimates for Lagoon #1 options.
10/29/97		E-mail to Stan Evans describing options

Keith -

As seen in the attached cost estimates, the choices come down quickly to options 2-5. Using probability of success as a deciding factor, option 4 is probably your best bet. Option 4 substantially reduces the risks (1) due to failure to achieve desired compressive strength and (2) due to possible future slope instability. It is possible to use Option(s) 2 (or 3), provided that the material stock-piled has enough compressive strength (CBR=10); this can only be determined by testing the soil in several, randomly selected points. Option(s) 3 (or 5) can be used, but there is an increased risk of slope failure due to instability within the next 20 years. Considering the accuracy of these estimates (+/- 25%), there is no appreciable difference between options 2 and 4 or options 3 and 5.

We can discuss during tomorrow's meeting.

JOB NO. 731397.03000

02000C02

CDF006785

Budget Estimates for
Options Described in Attached
E-Mail Message – Re: Lagoon #1 Fill.

① Lagoon #2 Sourcing (2000 yd^3)

1.	Removal, mixing, treating, placing, compacting (\$47.50/yd)	* 95,000
2.	Turning (assuming 4x @ \$1,750 ea)	7,000
3.	~~General conditions~~ (incl. mob/demob)	10,200
4.	Performance bond (1%)	1,100
5.	Engineering Services (incl. const. obs.)	13,600
		\$ 126,900

② Lagoon #3 Stock-pile (2000 yd^3)

1.	Transport, place + compact (15.00/yd^3)	\$ 30,000
2.	~~General~~ conditions	4,500
3.	Performance bond (1%)	400
4.	Engineering Services (incl. const obs.)	7,500
		\$ 42,400

③ Lagoon #3 Stock-pile (500 yd^3)

1.	Transport, place + compact (17.50/yd^3)	\$ 9,000
2.	General conditions	2200
3.	Bond (1%)	100
4.	Engineering Services (including const obs)	4,300
		\$ 15,600

CDF006786

④ Off-site Source (2000 yd^3)

1. Buy, transport, place, compact (19.00/yd^3) $38,000
2. General conditions 5,700
3. Perf. Bond (1%) 400
4. Engg. services (incl. const. observation) 4,400

$48,500

⑤ Off-site Source (500 yd^3)

1. Buy, transport, place, compact (21.50/yd^3) $10,800
2. General conditions 2,700
3. Perf. bond (1%) 100
4. Engg. Services 2,700

16,300

Notes

A. Option 1 is viable only if (and often) regulatory hurdles are cleared (i.e., permits, exemptions granted).

B. Options 2 + 3 are viable only if the stock-piled material can demonstrate appropriate compression test results

C. Compression test results will be required for any off-site sourced materials as well as TCLP test results.

D. Options 2 or 4 are preferred over options 3 and 5, respectively, in that they offer a higher safety factor; there is a small, but not immeasurable probability that a 2:1 slope (options 3+5) will slip within a 20-year lifespan. Prob = ~10-20%.

Author: Edward Karkalik at PARCLE
Date: 10/29/97 4:51 PM
Priority: Normal
Receipt Requested
TO: stane@beaverexcavating.com at -FABRIK/Internet
Subject: Canton Drop Forge Lagoon No. 1 Fill

------------------------------------ Message Contents ------------------------------------

Stan-

Based on the electronic file which you sent to me a couple of weeks ago for the topographical profile of Lagoon No.1, we have estimated that we need to add about 500 cu yds to achieve a 2:1 slope throughout or about 2,000 cu yds to achieve a 3:1 slope. Using this information, we are interested in getting a few budget-level cost estimates for finishing the reconstruction of Lagoon No. 1:

1 - borrow about 2,000 cu yds from Lagoon No.2, i.e., the top 2 feet of depositional material across the lagoon, place the material in the biocell area for the winter/spring, add about 20% (by total weight) of a mixture of lime, flyash and possibly a little portland cement to stabilize then place and compact the stabilized material in Lagoon No. 1 to achieve the desired slope. (Note that we expect that the volume of the resulting mixture will probably not "grow" by the 20% (or more, considering volume instead of weight) added; we think, based on the lab tests, that the added material will replace water in the matrix and not "grow" substantially).

2 - borrow about 2,000 cu yds from the stock-piles created in the past by dredging Lagoon No.3, then place and compact the material in Lagoon No. 1. (Note this and the following option will not be acceptable if the Lagoon No. 3 stock-piled material either cannot pass TCLP testing or cannot be compacted, due to uniformity and granularity, to the appropriate compressive strength (i.e., with a CBR of at least 10).

3 - borrow about 500 cu yds of the same material (as in option 2 above) and place and compact in Lagoon No. 1.

4 - borrow about 2,000 cu yds of clean fill from an off-site location near CDF, the place and compact the borrowed material in Lagoon No. 1. (Note that this material must also be tested to demonstrate that it is not TCLP leachable and that it will have the required compressive strength when compacted and placed).

5 - borrow about 500 cu yds of clean fill, as above in option 4, and place and compact in Lagoon No. 1; the same TCLP and CBR criteria apply.

Please note that we have already accommodated the volume required for the clay layer in these calculations. As we discussed, we are interested in being in a position to discuss these options on Wednesday, 5 November via telephone and then in person with Keith and CDF on Thursday, 6 November.

Please let me know if you encounter any problems in this. Thanks for agreeing to help us and CDF get the information that they need to make a decision on Lagoon No. 1.

Ed

2(b)
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VOLUMES REPORT

JOB NAME : 10067.EAS OG + 1ST GRADING (FINAL)
PRINTED : 10/31/1997 12:01:42 PM

(NO STRIPPING REGIONS SPECIFIED)

				AREA, SF			VOLUMES, CY (AFTER STRIPPING)	
REGION	LAYER	MATERIAL	SECT	TOTAL	CUT	FILL	CUT	FILL
1ST GRADING	NAT'L GROUND	SUITABLE	0.00	8942	5372	3570	150	96
JOB TOTAL	NAT'L GROUND	SUITABLE		8942	5372	3570	150	96

SITE AREA: 25153
UNSPECIFIED: 16211

These volumes were calculated using the AVERAGE END AREA method.
750 cross sections were computed at an average separation of 0.17 feet.

1st GRADING IN POND #1

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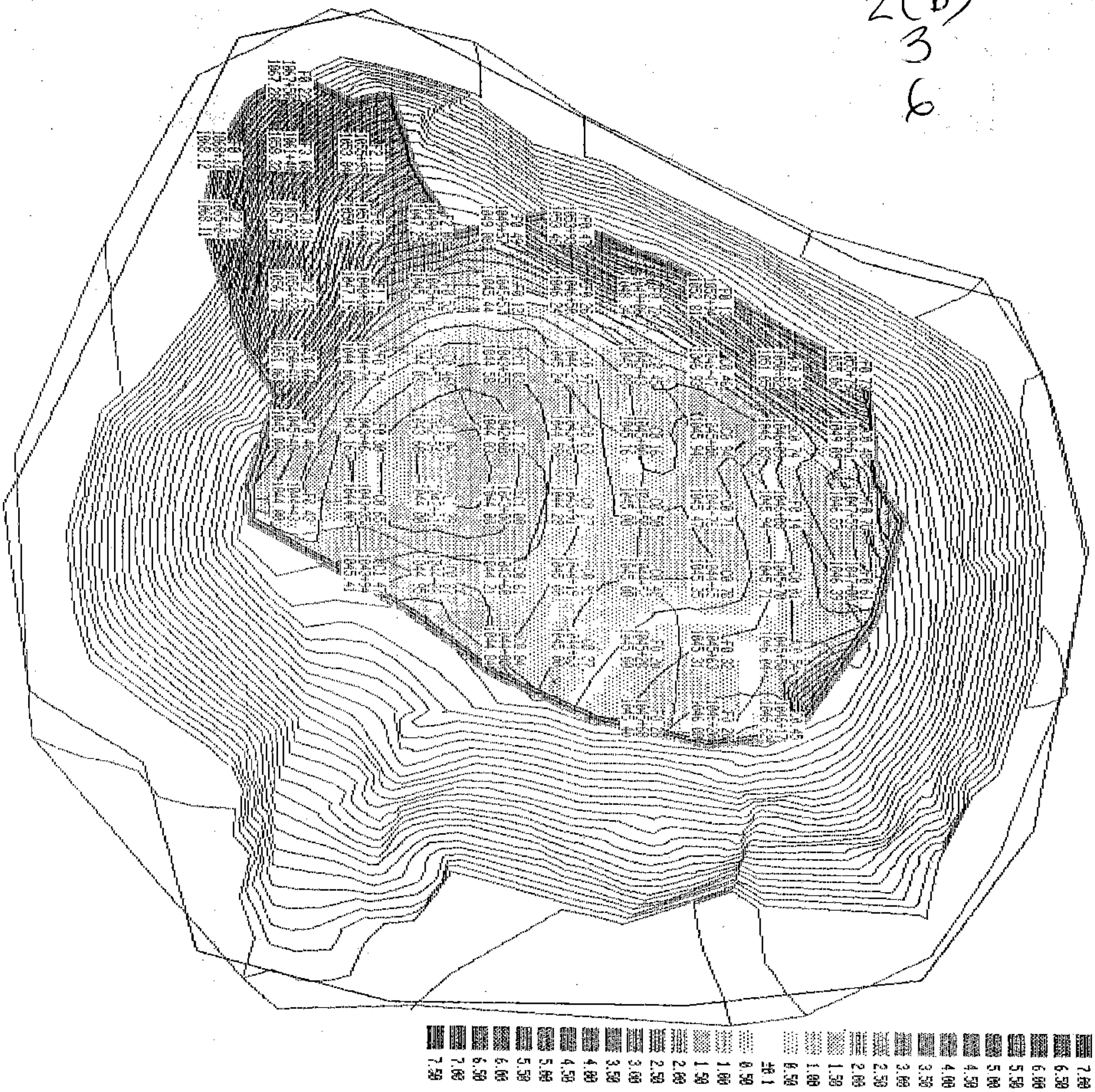

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CDF006791

VOLUMES REPORT
JOB NAME : 10069.EAS OG + 2ND GRADING (FINAL)
PRINTED : 10/31/1997 11:59:50 AM

(NO STRIPPING REGIONS SPECIFIED)

				AREA, SF			VOLUMES, CY (AFTER STRIPPING)	
REGION	LAYER	MATERIAL	SECT	TOTAL	CUT	FILL	CUT	FILL
2ND GRADING	NAT'L GROUND	SUITABLE	0.00	2510	1642	868	65	13
JOB TOTAL	NAT'L GROUND	SUITABLE		2510	1642	868	65	13

SITE AREA: 25153
UNSPECIFIED: 22643

These volumes were calculated using the AVERAGE END AREA method.
565 cross sections were computed at an average separation of 0.16 feet.

2ND GRADING IN POND #2

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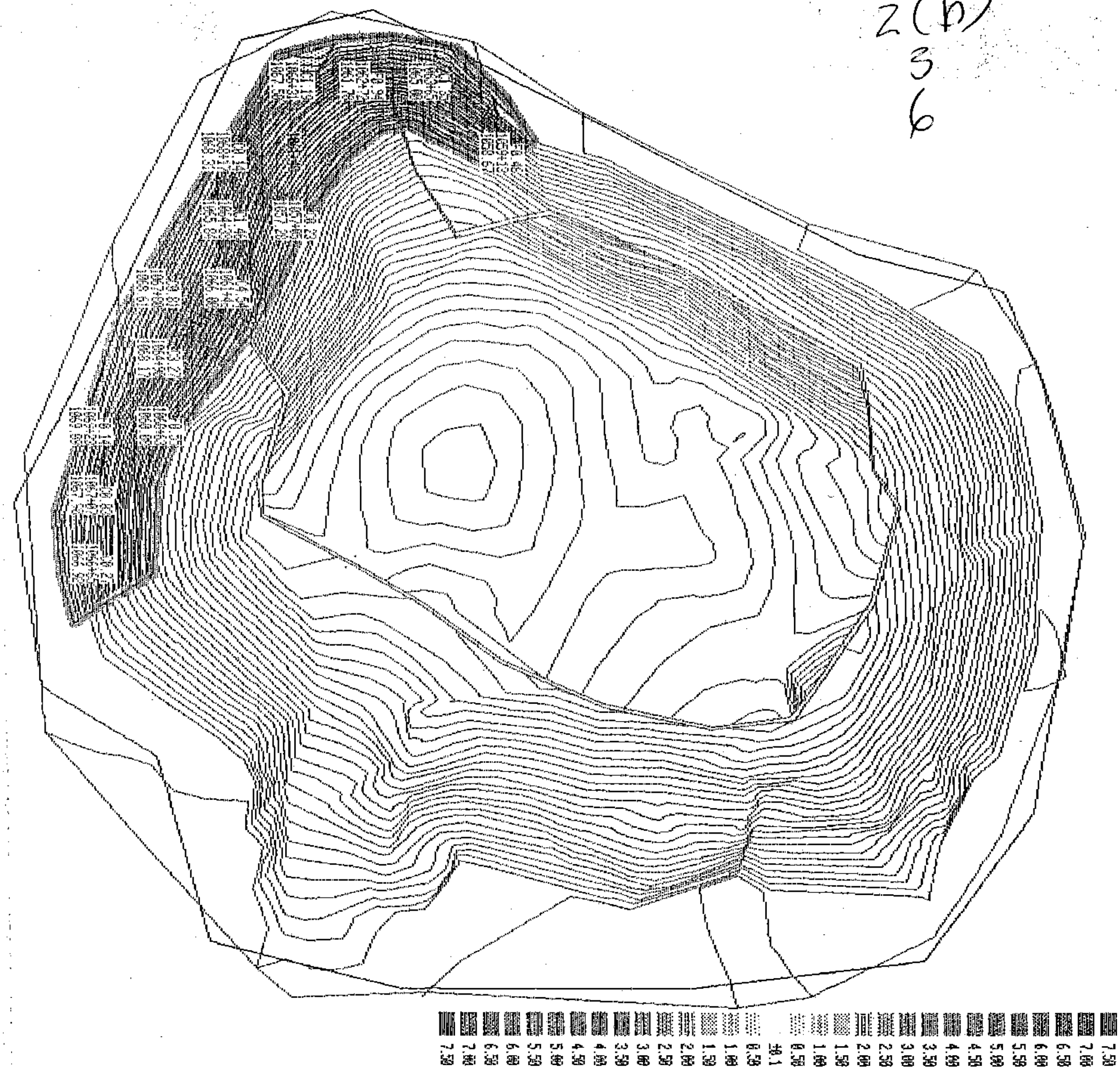

CDF006792

VOLUMES REPORT
JOB NAME : 10051.EAS PILE VOLUMES
PRINTED : 11/05/1997 02:36:52 PM

(NO STRIPPING REGIONS SPECIFIED)

REGION	LAYER	MATERIAL	SECT	AREA, SF TOTAL	AREA, SF CUT	AREA, SF FILL	VOLUMES, CY (AFTER STRIPPING) CUT	VOLUMES, CY (AFTER STRIPPING) FILL
PILE NORTH FROM TOE/PILE	NAT'L GROUND	SUITABLE	0.00	832	816	16	82	0
PILE SOUTH FROM TOE/PILE	NAT'L GROUND	SUITABLE	0.00	2848	2834	14	218	0
SUB TOTAL:	NAT'L GROUND	SUITABLE		3680	3650	30	300	0
JOB TOTAL	NAT'L GROUND	SUITABLE		3680	3650	30	300	0

SITE AREA: 40144
UNSPECIFIED: 36464

These volumes were calculated using the AVERAGE END AREA method.
564 cross sections were computed at an average separation of 0.17 feet.

Soil removed from Pond #1

CDF006793

JOB NAME : 10055.EAS CLAY LINER VOLUME
VOLUMES REPORT
PRINTED : 11/05/1997 02:42:54 PM

(NO STRIPPING REGIONS SPECIFIED)

REGION	LAYER	MATERIAL	SECT	AREA, SF TOTAL	AREA, SF CUT	AREA, SF FILL	VOLUMES, CY (AFTER STRIPPING) CUT	VOLUMES, CY (AFTER STRIPPING) FILL
CLAY LINER VOLUME	NAT'L GROUND	SUITABLE	0.00	12835	503	12332	6	687
JOB TOTAL	NAT'L GROUND	SUITABLE		12835	503	12332	6	687

SITE AREA: 44323
UNSPECIFIED: 31488

These volumes were calculated using the AVERAGE END AREA method.
895 cross sections were computed at an average separation of 0.17 feet.

12" CLAY LINER

ACTUAL AREA 13,721 SF

1' DEEP = 508 CY PAY QUANTITY

CDF006794

JOB NAME : 10053.EAS BIOCELL VOLUME
VOLUMES REPORT
PRINTED : 11/05/1997 02:40:50 PM

(NO STRIPPING REGIONS SPECIFIED)

				AREA, SF			VOLUMES, CY (AFTER STRIPPING)	
REGION	LAYER	MATERIAL	SECT	TOTAL	CUT	FILL	CUT	FILL
BIOCELL VOLUME REMOVED	NAT'L GROUND	SUITABLE	0.00	72696	70999	1697	3221	16
JOB TOTAL	NAT'L GROUND	SUITABLE		72696	70999	1697	3221	16

SITE AREA: 112040
UNSPECIFIED: 39344

These volumes were calculated using the AVERAGE END AREA method.
1494 cross sections were computed at an average separation of 0.17 feet.

Soil Removed From Biocell

2(b)
3

PARSONS ENGINEERING SCIENCE, INC.

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

DATE: 11/4/97

TO: MR KEITH HOUSEKNECHT
LOCATION: CDF
RAPIDFAX NO.: 330-477-2046
COPIES TO:

FROM: ED KARKALIK

TOTAL NUMBER OF PAGES 5 (including this cover letter)

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL BACK AS SOON AS POSSIBLE.

We are herewith transmitting the following:

DATE	NO.	DESCRIPTION

KEITH -
AS WE DISCUSSED - SORRY IT HAS TAKEN SO LONG TODAY TO GET TO YOU.

PLEASE CALL, IF YOU WANT TO DISCUSS.

THE SHORT ANSWERS ARE:

LAGOON #2 NO ACTION - NO REQUIREMENTS
" " REMOVAL - PROBABLY WILL REQUIRE AGENCY INVOLVEMENT.

Ed

JOB NO. 731397030000

02000002

CDF003796

PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119
PARESCL/1097/Dee/EJK7-46

2(b)
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15 October 1997

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Proposal to Develop Bid Package and Construction Contracting Documents for the Removal Of Depositional Material from Lagoon No. 2

Dear Keith:

Confirming our telephone conversations during the week of 6 October 1997 and our discussions during Mr. Wilson Rownd's and my visit on 7 October 1997, Parsons Engineering Science, Inc. (Parsons ES) is pleased to have this opportunity to present the above-referenced proposal (Proposal) to Canton Drop Forge, Inc. (CDF). It is our understanding that CDF is interested in removing about 3,000 cubic yards of the most fluid portion of depositional material from Lagoon No. 2 and transferring this material into the holding area previously referred to as the "bio-cell" (cell) on CDF's property (the Project). The objectives of the proposed Project are:

A. to remove the free floating oil (to be collected and discharged into the oil recovery tank), free water (to be discharged to Lagoon No. 3), and depositional material (to be transferred to the cell) from Lagoon No. 2 to prepare the material for stabilization and solidification;

B. to promote the "pre-treatment" of the subject material through the application of natural de-watering and other natural weathering processes, which reduce the overall moisture content of the material; and

C. to provide additional space in Lagoon No. 2 for the subsequent (during 1998) stabilization and solidification of remaining material in place (i.e., in the bottom of the Lagoon).

PROPOSED SCOPE OF WORK

The following tasks comprise our Proposed Scope of Work for this Project:

Task 1 - Develop Bid Documents

Pending the outcome of discussions with Ohio EPA (the subject of a proposal previously submitted - on 10 October 1997 - to you) and commencing with the results of the environmental, geotechnical and treatability testing analyses previously generated and reported for the depositional material in Lagoon No. 2, Parsons ES will develop a design package for the proposed work. In particular, Parsons ES will develop general and technical specifications for the Project. Also, we will develop a general plot plan, showing the location of the Project elements, and a conceptual process drawing for the proposed work. Consideration of the following alternate means, among others, for the removal and transfer of depositional material from Lagoon No. 2, will be undertaken:

- bucket and/or drag-line removal, operated from a crane, with direct transfer to the cell;
- bucket and/or drag-line removal, with transfer to dump trucks for hauling to the cell;
- dredging, with pumping directly to the cell; and
- turbo-vacuum pump removal, with pumping directly to the cell

Guidance for Health & Safety Plan (HASP), work scheduling and cost control document preparation, by the selected contractor, will also be provided.

Task 2 - Solicit/Review Bids

Parsons ES will identify up to five (5) prospective, pre-qualified construction contractors, the names of which will be reviewed with and approved by CDF, for receipt of the proposed bid documentation. Parsons ES will solicit, on CDF's behalf, bids from the identified contractors. In the course of doing so, we will conduct a pre-bid review meeting at the CDF property with the prospective contractors.

Once bids have been received for CDF, Parsons ES will review the submittals and recommend a selection to CDF for award.

Task 3 - Support Contract Negotiations

Pending CDF's approval of the selected contractor, Parsons ES will support CDF in the negotiation of contract documents with the identified entity. Based on the conclusion of these discussions, Parsons ES will prepare, on CDF's behalf, final contract documents. A Parsons ES representative will attend one meeting at CDF for contract negotiations. We will forward to CDF the completed documentation for CDF's execution of a contract with the successful contractor.

Task 3A - Provide Alternate Contracting Support

Confirming our discussions during our visit on 7 October 1997, Parsons ES offers to CDF an alternate means for securing a contract for the required construction services. In particular, **in lieu of Tasks 1 through 3 above**, Parsons ES proposes that CDF consider selecting one contractor (i.e., The Beaver Excavating Company), providing a less defined package on which Beaver would be required to bid, and then negotiating a contract with Beaver. This approach has the potential advantages of being less costly administratively and possibly faster and easier than soliciting bids from several contractors. As discussed with you on 7 October 1997, this approach also has two potential disadvantages: (1) CDF would benefit only from the construction methodologies in which Beaver is experienced (i.e., excavate and transport via conventional methods) and (2) Beaver may not be the least expensive (on a unit cost basis) contractor to be considered for the proposed work.

Task 4 - Provide Construction Observation Services

Parsons ES will initiate the construction phase of the Project with a pre-construction conference on CDF's property. The intent of the meeting will be to confirm the scope, specifications and schedule of the proposed work, to establish lines of authority and communications, and to ensure that HASP, security and work plan procedures are mutually understood among the CDF, Parsons ES, and selected contractor's representatives.

Parsons ES will then assist CDF in the construction phase of the Project by providing on-site construction observation during critical phases of the work. In particular, Parsons ES will observe

1. the removal and transfer of free oil and water, to the appropriate destinations, respectively;
2. removal and transfer of the initial quantities of depositional material into the cell; and
3. witnessing of the final pass or cut of material to be removed from Lagoon No. 2.

To verify that the appropriate amounts of the material have been removed, Parsons ES will sub-contract, on CDF's behalf, the physical surveying of the dimensions and volume of the cell and Lagoon No. 2 during the following two occasions - once each (1) before commencement of and (2) subsequent to the completion of the removal and transfer of the depositional material. Parsons ES will monitor the placement of the material in the cell to ensure that weathering, as planned, can occur.

Task 5 - Project Administration

Prior to the commencement of the construction phase of the Project, Parsons ES will work with CDF and the selected contractor to develop a mutually acceptable project schedule, project plan and HASP for the execution of the work. The overall objective of the project plan is to ensure that work methods and procedures planned by the selected contractor comply with CDF's expectations and the specifications contained in the bid documents. The project plan will be developed in outline or bullet format and, hence, is not intended to be overly long or complex.

During the course of the project, Parsons ES will provide project administrative support to CDF, including biweekly status meetings and reporting of progress with respect to schedule and budget. In budgeting for this activity, Parsons ES has assumed that the duration of the project will not exceed seven (7) weeks (see below).

PROPOSED BUDGET AND SCHEDULE

Parsons ES proposes to complete the Proposed Scope of Work, as described above, on a "time and expenses, total not-to-exceed" basis, for a cost of not more than $7,000. If CDF prefers to use the alternate contracting approach (Task 3A), in lieu of the traditional approach (described in Tasks 1 through 3), Parsons ES costs would not exceed $4,991.

Using terms and conditions identical to those employed in our proposal for similar services for Lagoon No. 1, dated 13 June 1997, Parsons ES' labor costs will be based on direct labor rates times a multiplier of 2.80 and invoiced other direct costs (ODCs) marked-up by 7%. In that the primary construction contract will be issued by CDF directly to the selected vendor, costs for construction services are not reflected in this total. Please refer to Figure 1 for a detailed break-down of the proposed budget.

Parsons ES anticipates a seven (7) week schedule for the implementation of this work, as follows:

1. Bid document preparation, including conducting a pre-bid meeting, will be completed within two (2) weeks of receipt of authorization to proceed (RAP) from CDF;
2. Pending receipt of bids (acceptable to CDF) from the solicited contractors, we anticipate that the contract selection, award and negotiations will be completed within another two (2) weeks; and
3. Assuming that one of the criteria for contractor selection will be responsiveness, i.e., ability of the contractor to mobilize within several days, we expect the work to be completed within an additional three (3) weeks.
4. The relocation of overhead power lines, in the area between the cell and Lagoon No. 2, will be completed by CDF prior to the award of this work (and, hence, will not impact the overall schedule). Also, prior to commencement of work, it has been assumed that CDF will remove as much separate-phase oil and water from the Lagoon as reasonably feasible.

PROJECT TEAM

The primary technical contributors, for the Tasks defined above, will include the following:

- Gordon Melle - oversight for engineering, bid solicitation and review, and contracting;
- Beth McCartney - bid package development;
- Sam Saad - construction observation;
- Alan Resnik - applicability of VAP rules;
- Jocelyn DeAngelis - drafting/CADD; and
- Ed Karkalik - project management.

Resumes of proposed project contributors are available, upon request, if desired.

Appendix A

Supplemental Terms and Conditions

<u>Dispute Resolution Provisions</u>

Notwithstanding anything to the contrary elsewhere in this Agreement or Contract, in the event of a dispute between the parties arising out of or related to this Agreement or Contract, the parties shall use the following procedure as a condition precedent to either party pursuing other available remedies:

1. A party who believes a dispute exists (the "Disputing Party") shall put such dispute in writing to the other party (the "Responding Party"). Such writing shall clearly, though as briefly as practicable, state the substance and scope of the dispute, the Disputing Party's position relative thereto, including legal and factual justifications therefor, the remedy sought, and any other pertinent matters.

2. The Responding Party who receives such a writing shall respond in writing to the Disputing Party within ten business days. Such writing shall clearly, though as briefly as practicable, state the Responding Party's response to each of the items included in the Disputing Party's writing, and any other pertinent matters.

3. A meeting shall be held within ten business days attended by representatives of the parties having decision-making authority regarding the dispute, to attempt in good faith to negotiate a resolution of the dispute.

4. If, within ten business days after such meeting, the parties have not succeeded in negotiating a resolution of the dispute, the parties' representatives shall submit the dispute to one of their senior-level executives (including Presidents, Executive Vice Presidents, Senior Vice Presidents, and Chief Financial Officers) for review. A meeting shall be held within ten business days after such submission attended by such senior-level executives of the parties and any necessary representatives to attempt in good faith to negotiate a resolution of the dispute.

5. If, within ten business days after such meeting, the parties have not succeeded in negotiating a resolution of the dispute, the parties shall jointly appoint a mutually acceptable neutral person (the "Neutral"), or if they have been unable to agree upon such appointment within ten business days, then the American Arbitration Association by default, or other mutually agreed-upon organization, shall appoint such Neutral upon the application of either party. The fees of, and authorized costs incurred by, the Neutral shall be shared equally by the parties.

6. In consultation with the Neutral, the parties shall select or devise an alternative dispute resolution procedure (ADR) by which they will attempt to resolve the dispute, and a time and place for the ADR to be held, with the Neutral making the decision as to any such matters, if the parties have been unable to agree thereon within ten business days after initial consultation with the Neutral.

7. The parties agree to participate in good faith in the ADR for a minimum period of ten business days from the commencement of the ADR procedure. If the parties are not successful in resolving the dispute through the ADR, and the amount in dispute does not exceed $250,000.00, then the dispute shall be settled by arbitration in accordance with the Commercial Arbitration Rules of the American Arbitration Association, and judgment upon the award rendered by the arbitrator(s) may be entered in any court having jurisdiction. If the amount in dispute exceeds $250,000.00, then the parties may agree to submit the matter to binding arbitration, or either party may pursue other available remedies upon ten business days written notice to the other party specifying its intended course of action.

8. The parties may mutually agree in writing to extend any of the time periods stated herein. If a party fails to act within the time period specified herein, as mutually extended, such failure shall constitute waiver by such party of such condition, and the other party may proceed immediately to the next remedial step.

9. The parties agree that the ADR is a compromise negotiation for purposes of the federal and state rules of evidence. The entire procedure will be confidential. All conduct, statements, promises, offers, views and opinions, whether oral or written, made in the course of the ADR by any of the parties, their agents, employees, representatives or other invitees to the ADR and by the Neutral, who is the parties' joint agent for purposes of these compromise negotiations, are confidential and shall, in addition and where appropriate, be deemed to be work product and privileged. Such conduct, statements, promises, offers, views and opinions shall not be discoverable or admissible for any purposes, including impeachment, in any litigation or other proceeding involving the parties and shall not be disclosed to anyone not an agent, employee, expert, witness, or representative for any of the parties. Evidence otherwise discoverable or admissible is not excluded from discovery or admission as a result of its use in the ADR.

PARSONS ENGINEERING SCIENCE COMPANIES

ENGINEERING SERVICES AGREEMENT

PARSONS ES: 19101 Villaview Road
Suite 301
Cleveland, OH 44119

AGREEMENT NO.______________________

CLIENT'S ID. NO.______________________

CLIENT: Canton Drop Forge, Inc.
4575 Southway St., SW
Canton, OH 44706

EFFECTIVE DATE	COMPLETION DATE	PARSONS ES' CONTACT	CLIENT'S CONTACT
01 November 1997	31 December 1997	Edward J. Karkalik ( ) 216-486-9005	Keith Houseknecht ( ) 330-477-4511

COMPENSATION

☐ STANDARD RATE SCHEDULE
☐ (Attachment A)
☒ PAYMENT SHALL NOT EXCEED $ 7,000.00
UNLESS AUTHORIZED IN WRITING BY CLIENT

☒ OTHER (as indicated below)
☐ LUMP SUM $__________
☒ INVOICE MONTHLY (INSTRUCTIONS BELOW)

ITEM	DESCRIPTION OF SERVICES/SPECIAL PROVISION
01	Engineering Services, as described in Parsons ES' Proposal dated 15 October 1997 for the removal of depositional material from Lagoon No. 2 at Canton Drop Forge, Inc. Labor will be billed at direct labor rates times a 2.80 multiplier; other direct costs (ODCs), which are invoiced to Parsons ES, will be marked-up by 7%. All scheduled ODCs will be charged in accordance with the rates included in our 13 June 1997 proposal. Supplementary Terms and Conditions, indicated as Appendix A (attached), also apply.

PARSONS ES

Date 10.15.97.

Wilson H. Rownd, P.E.
Vice President/Manager
PARSONS ENGINEERING SCIENCE, INC.
19101 Villaview Road, Suite 301
Cleveland, OH 44119

CLIENT CANTON DROP FORGE, INC.

Date

J.P. Bressanelli
President

THE STANDARD TERMS AND CONDITIONS CONTAINED ON THE REVERSE SIDE HEREOF ARE APPLICABLE TO THIS AGREEMENT

PARSONS

REV 10/96

PARSONS ES ACCOUNTING

PARSONS ENGINEERING SCIENCE COMPANIES

ENGINEERING SERVICES AGREEMENT

PARSONS ES: 19101 Villaview Road
Suite 301
Cleveland, OH 44119

AGREEMENT NO.__________

CLIENT'S ID. NO.__________

CLIENT: Canton Drop Forge, Inc.
4575 Southway St., SW
Canton, OH 44706

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- ☐ LUMP SUM $________
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Ed Karkalik

PARSONS ES
Date 10.15.97
Wilson H. Rownd, P.E.
Vice President/Manager
PARSONS ENGINEERING SCIENCE, INC.
19101 Villaview Road, Suite 301
Cleveland, OH 44119

CLIENT CANTON DROP FORGE, INC.
Date
J.P. Bressanelli
President

THE STANDARD TERMS AND CONDITIONS CONTAINED ON THE REVERSE SIDE HEREOF ARE APPLICABLE TO THIS AGREEMENT

PARSONS

REV 10/96

CLIENT

CDF006803

PARSONS ENGINEERING SCIENCE COMPANIES

ENGINEERING SERVICES AGREEMENT

PARSONS ES: 19101 Villaview Road
Suite 301
Cleveland, OH 44119

AGREEMENT NO. ____________

CLIENT'S ID. NO. ____________

CLIENT: Canton Drop Forge, Inc.
4575 Southway St., SW
Canton, OH 44706

EFFECTIVE DATE	COMPLETION DATE	PARSONS ES' CONTACT	CLIENT'S CONTACT
01 November 1997	31 December 1997	Edward J. Karkalik ( ) ~~216-486-9005~~	Keith Houseknecht ( ) ~~330-477-4511~~

COMPENSATION

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☐ (Attachment A)
☐ PAYMENT SHALL NOT EXCEED $ 7,000.00
UNLESS AUTHORIZED IN WRITING BY CLIENT

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☐ LUMP SUM $____________
☒ INVOICE MONTHLY (INSTRUCTIONS BELOW)

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PARSONS ES

~~Wilson H. Rownd, P.E.~~ Date 10.15.97
Vice President/Manager
~~PARSONS ENGINEERING SCIENCE, INC.~~
19101 Villaview Road, Suite 301
~~Cleveland, OH 44119~~

CLIENT CANTON DROP FORGE, INC.

~~J.P. Bressanelli~~ Date
President

THE STANDARD TERMS AND CONDITIONS CONTAINED ON THE REVERSE SIDE HEREOF ARE APPLICABLE TO THIS AGREEMENT

CDF006804

Quanterra Environmental Services

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

330 497-9396 Telephone
330 497-0772 Fax

2 (b)
3

ANALYTICAL REPORT

CANTON DROP FORGE

Lot #: A7G250101

Michael R. Leffler

Parsons Engineering Science, I

QUANTERRA INCORPORATED

Rebecca Strait
Rebecca L. Strait
Project Manager

August 7, 1997

EXECUTIVE SUMMARY - Detection Highlights

A7G250101

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
1AI 01 MICRON IN 07/24/97 08:45 001				
Oil and Grease (Gravimetric)	41	5.0	mg/L	MCAWW 413.1
1AE 01 MICRON OUT 07/24/97 08:45 002				
Oil and Grease (Gravimetric)	37	5.0	mg/L	MCAWW 413.1
1ASI 01 MICRON IN 07/24/97 08:50 003				
Total Suspended Solids	140	4.0	mg/L	MCAWW 160.2
1ASE 01 MICRON OUT 07/24/97 08:50 004				
Total Suspended Solids	120	4.0	mg/L	MCAWW 160.2
10AI 10 MICRON IN 07/24/97 09:40 005				
Oil and Grease (Gravimetric)	54	5.0	mg/L	MCAWW 413.1
10AE 10 MICRON OUT 07/24/97 09:43 006				
Oil and Grease (Gravimetric)	32	5.0	mg/L	MCAWW 413.1
1BE 01 MICRON OUT 2 07/24/97 09:25 007				
Oil and Grease (Gravimetric)	34	5.0	mg/L	MCAWW 413.1
10ASE 10 MICRON OUT 07/24/97 09:51 008				
Total Suspended Solids	140	4.0	mg/L	MCAWW 160.2
10ASI 10 MICRON IN 07/24/97 09:49 009				
Total Suspended Solids	140	4.0	mg/L	MCAWW 160.2

(Continued on next page)

EXECUTIVE SUMMARY - Detection Highlights

A7G250101

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
10BE 10 MICRON OUT 2 07/24/97 10:25 010				
Oil and Grease (Gravimetric)	34	5.0	mg/L	MCAWW 413.1
10BSE 10 MICRON OUT 2 07/24/97 10:27 011				
Total Suspended Solids	120	4.0	mg/L	MCAWW 160.2
1EAI 1 MICRON IN 07/24/97 10:37 012				
Oil and Grease (Gravimetric)	48	5.0	mg/L	MCAWW 413.1
1EAE 1 MICRON OUT 07/24/97 10:45 013				
Oil and Grease (Gravimetric)	50	5.0	mg/L	MCAWW 413.1
1ESAI 1 MICRON IN 07/24/97 10:50 014				
Total Suspended Solids	140	4.0	mg/L	MCAWW 160.2
1ESAE 1 MICRON OUT 07/24/97 10:51 015				
Total Suspended Solids	130	4.0	mg/L	MCAWW 160.2
1EBI 1 MICRON IN 2 07/24/97 11:30 016				
Oil and Grease (Gravimetric)	48	5.0	mg/L	MCAWW 413.1
1EBE 1 MICRON OUT 2 07/24/97 11:34 017				
Oil and Grease (Gravimetric)	47	5.0	mg/L	MCAWW 413.1
1EBSI 1 MICRON IN 2 07/24/97 11:38 018				
Total Suspended Solids	180	4.0	mg/L	MCAWW 160.2

(Continued on next page)

EXECUTIVE SUMMARY - Detection Highlights

A7G250101

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
1EBSE 1 MICRON OUT 2 07/24/97 11:38 019				
Total Suspended Solids	170	4.0	mg/L	MCAWW 160.2
1ECE 1 MICRON OUT 3 07/24/97 12:30 020				
Oil and Grease (Gravimetric)	34	5.0	mg/L	MCAWW 413.1
1ESCE 1 MICRON OUT 3 07/24/97 12:33 021				
Total Suspended Solids	160	4.0	mg/L	MCAWW 160.2
1EDE 1 MICRON OUT 4 07/24/97 13:28 022				
Oil and Grease (Gravimetric)	54	5.0	mg/L	MCAWW 413.1
1ESDE 1 MICRON OUT 4 07/24/97 13:38 023				
Total Suspended Solids	220	4.0	mg/L	MCAWW 160.2
1ESDI 1 MICRON IN 4 07/24/97 13:38 024				
Total Suspended Solids	310	4.0	mg/L	MCAWW 160.2

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 1AE 01 MICRON OUT

General Chemistry

Lot-Sample #...: A7G250101-002 **Work Order #...:** CAWDJ **Matrix.........:** WATER
Date Sampled...: 07/24/97 08:45 **Date Received..:** 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Oil and Grease (Gravimetric)	37	5.0	mg/L	MCAWW 413.1	07/30/97	7211185

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 1ASI 01 MICRON IN

General Chemistry

Lot-Sample #...: A7G250101-003 **Work Order #...:** CAWDM **Matrix.........:** WATER
Date Sampled...: 07/24/97 08:50 **Date Received..:** 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Suspended Solids	**140**	**4.0**	**mg/L**	**MCAWW 160.2**	**07/31/97**	**7212146**

Dilution Factor: 1

CDF006810

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 1ASE 01 MICRON OUT

General Chemistry

Lot-Sample #...: A7G250101-004 **Work Order #...:** CAWDP **Matrix.........:** WATER
Date Sampled...: 07/24/97 08:50 **Date Received..:** 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Suspended Solids	**120**	**4.0**	**mg/L**	**MCAWW 160.2**	**07/31/97**	**7212146**

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 10AI 10 MICRON IN

General Chemistry

Lot-Sample #...: A7G250101-005 **Work Order #...:** CAWDQ **Matrix.........:** WATER
Date Sampled...: 07/24/97 09:40 **Date Received..:** 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Oil and Grease (Gravimetric)	**54**	**5.0**	**mg/L**	**MCAWW 413.1**	**07/30/97**	**7211185**

Dilution Factor: 1

CDF006812

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 10AE 10 MICRON OUT

General Chemistry

Lot-Sample #...: A7G250101-006 **Work Order #...:** CAWDR **Matrix.........:** WATER
Date Sampled...: 07/24/97 09:43 **Date Received..:** 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Oil and Grease (Gravimetric)	32	5.0	mg/L	MCAWW 413.1	07/30/97	7211185

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 1BE 01 MICRON OUT 2

General Chemistry

Lot-Sample #...: A7G250101-007 **Work Order #...:** CAWDT **Matrix.........:** WATER
Date Sampled...: 07/24/97 09:25 **Date Received..:** 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Oil and Grease (Gravimetric)	**34**	**5.0**	**mg/L**	**MCAWW 413.1**	**07/30/97**	**7211185**

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 10ASE 10 MICRON OUT

General Chemistry

Lot-Sample #...: A7G250101-008 Work Order #...: CAWDV Matrix.........: WATER
Date Sampled...: 07/24/97 09:51 Date Received..: 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Suspended Solids	140	4.0	mg/L	MCAWW 160.2	07/31/97	7212146

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 10ASI 10 MICRON IN

General Chemistry

Lot-Sample #...: A7G250101-009 **Work Order #...:** CAWDW **Matrix.........:** WATER
Date Sampled...: 07/24/97 09:49 **Date Received..:** 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Suspended Solids	140	4.0	mg/L	MCAWW 160.2	07/31/97	7212146

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 10BE 10 MICRON OUT 2

General Chemistry

Lot-Sample #...: A7G250101-010 Work Order #...: CAWDX Matrix.........: WATER
Date Sampled...: 07/24/97 10:25 Date Received..: 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Oil and Grease (Gravimetric)	34	5.0	mg/L	MCAWW 413.1	07/30/97	7211185

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 10BSE 10 MICRON OUT 2

General Chemistry

Lot-Sample #...: A7G250101-011 Work Order #...: CAWE0 Matrix.........: WATER
Date Sampled...: 07/24/97 10:27 Date Received..: 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Suspended Solids	120	4.0	mg/L	MCAWW 160.2	07/31/97	7212146

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 1EAI 1 MICRON IN

General Chemistry

Lot-Sample #...: A7G250101-012 Work Order #...: CAWE1 Matrix.........: WATER
Date Sampled...: 07/24/97 10:37 Date Received..: 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Oil and Grease (Gravimetric)	48	5.0	mg/L	MCAWW 413.1	07/30/97	7211185

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 1ESAI 1 MICRON IN

General Chemistry

Lot-Sample #...: A7G250101-014 **Work Order #...:** CAWE5 **Matrix.........:** WATER
Date Sampled...: 07/24/97 10:50 **Date Received..:** 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Suspended Solids	140	4.0	mg/L	MCAWW 160.2	07/31/97	7212146

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 1ESAE 1 MICRON OUT

General Chemistry

Lot-Sample #...: A7G250101-015 **Work Order #...:** CAWE6 **Matrix.........:** WATER
Date Sampled...: 07/24/97 10:51 **Date Received..:** 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Suspended Solids	**130**	**4.0**	**mg/L**	**MCAWW 160.2**	**07/31/97**	**7212146**

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 1EBI 1 MICRON IN 2

General Chemistry

Lot-Sample #...: A7G250101-016 **Work Order #...:** CAWE7 **Matrix.........:** WATER
Date Sampled...: 07/24/97 11:30 **Date Received..:** 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Oil and Grease (Gravimetric)	**48**	**5.0**	**mg/L**	**MCAWW 413.1**	**07/31/97**	**7212173**

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 1EBE 1 MICRON OUT 2

General Chemistry

Lot-Sample #...: A7G250101-017 **Work Order #...:** CAWE8 **Matrix.........:** WATER
Date Sampled...: 07/24/97 11:34 **Date Received..:** 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Oil and Grease (Gravimetric)	**47**	**5.0**	**mg/L**	**MCAWW 413.1**	**07/31/97**	**7212173**

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 1EBSI 1 MICRON IN 2

General Chemistry

Lot-Sample #...: A7G250101-018 **Work Order #...:** CAWE9 **Matrix.........:** WATER
Date Sampled...: 07/24/97 11:38 **Date Received..:** 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Suspended Solids	180	4.0	mg/L	MCAWW 160.2	07/31/97	7212146

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 1EBSE 1 MICRON OUT 2

General Chemistry

Lot-Sample #...: A7G250101-019 **Work Order #...:** CAWEA **Matrix.........:** WATER
Date Sampled...: 07/24/97 11:38 **Date Received..:** 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Suspended Solids	170	4.0	mg/L	MCAWW 160.2	07/31/97	7212146

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 1ECE 1 MICRON OUT 3

General Chemistry

Lot-Sample #...: A7G250101-020 **Work Order #...:** CAWEC **Matrix.........:** WATER
Date Sampled...: 07/24/97 12:30 **Date Received..:** 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Oil and Grease (Gravimetric)	**34**	**5.0**	**mg/L**	**MCAWW 413.1**	**07/31/97**	**7212173**

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 1EDE 1 MICRON OUT 4

General Chemistry

Lot-Sample #...: A7G250101-022 Work Order #...: CAWEE Matrix.........: WATER
Date Sampled...: 07/24/97 13:28 Date Received..: 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Oil and Grease (Gravimetric)	54	5.0	mg/L	MCAWW 413.1	07/31/97	7212173

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 1ESDE 1 MICRON OUT 4

General Chemistry

Lot-Sample #...: A7G250101-023 Work Order #...: CAWEF Matrix.........: WATER
Date Sampled...: 07/24/97 13:38 Date Received..: 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Suspended Solids	220	4.0	mg/L	MCAWW 160.2	07/31/97	7212146

Dilution Factor: 1

PARSONS ENGINEERING SCIENCE, INC.

Client Sample ID: 1ESDI 1 MICRON IN 4

General Chemistry

Lot-Sample #...: A7G250101-024 Work Order #...: CAWEG Matrix.........: WATER
Date Sampled...: 07/24/97 13:38 Date Received..: 07/24/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Suspended Solids	**310**	**4.0**	**mg/L**	**MCAWW 160.2**	**07/31/97**	**7212146**

Dilution Factor: 1

QUALITY CONTROL SECTION

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Lot-Sample #...: A7G250101 **Matrix.........:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Oil and Grease (Gravimetric)		WO#:CC0R0102-LCS/CC0R0103-LCSD			LCS Lot-Sample#: A7G300000-185		
	96	(75 - 125)			MCAWW 413.1	07/30/97	7211185
	111	(75 - 125)	14	(0-20)	MCAWW 413.1	07/30/97	7211185
		Dilution Factor: 1					
Oil and Grease (Gravimetric)		WO#:CC1DH102-LCS/CC1DH103-LCSD			LCS Lot-Sample#: A7G310000-173		
	92	(75 - 125)			MCAWW 413.1	07/31/97	7212173
	94	(75 - 125)	1.1	(0-20)	MCAWW 413.1	07/31/97	7212173
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: A7G250101 **Matrix.........:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Suspended Solids		Work Order #: CC1AH102 LCS Lot-Sample#: A7G310000-146			
	82	(80 - 120) Dilution Factor: 1	MCAWW 160.2	07/31/97	7212146

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

Client Lot #...: A7G250101 **Matrix.........:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Oil and Grease (Gravimetric)		Work Order #: CC0R0101		MB Lot-Sample #:	A7G300000-185	
	ND	5.0	mg/L	MCAWW 413.1	07/30/97	7211185
		Dilution Factor: 1				
Oil and Grease (Gravimetric)		Work Order #: CC1DH101		MB Lot-Sample #:	A7G310000-173	
	ND	5.0	mg/L	MCAWW 413.1	07/31/97	7212173
		Dilution Factor: 1				
Total Suspended Solids		Work Order #: CC1AH101		MB Lot-Sample #:	A7G310000-146	
	ND	4.0	mg/L	MCAWW 160.2	07/31/97	7212146
		Dilution Factor: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: A7G250101 **Work Order #...:** CAWDM-SMP CAWDM-DUP **Matrix.......:** WATER

Date Sampled...: 07/24/97 08:50 **Date Received..:** 07/24/97

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Suspended Solids						SD Lot-Sample #: A7G250101-003		
	140	150	mg/L	9.9	(0-20)	MCAWW 160.2	07/31/97	7212146
		Dilution Factor: 1						

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: A7G250101 **Work Order #...:** CC0C8-SMP CC0C8-DUP **Matrix.......:** WATER

Date Sampled...: 07/26/97 17:00 **Date Received..:** 07/29/97

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Suspended Solids						SD Lot-Sample #: A7G300101-015		
	29	36	mg/L	22	(0-20)	MCAWW 160.2	07/31/97	7212146
		Dilution Factor: 1						

[redacted]

Chain of Custody Record

Quanterra

QUA-4124

Client	Project Manager	Date	Chain Of Custody Number
PARSONS ES	Mike LEFFLER	7/24/97	08654

Address	Telephone Number (Area Code)/Fax Number	Lab Number	Page
19101 Villaview Rd	216/486-9005 / 216/486-6119		Page 1 of 1+Attn

City	State	Zip Code	Site Contact
Cleveland	OH	44119	

Project Name	Carrier/Waybill Number
Canton Drop Forge	

Contract/Purchase Order/Quote No.

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: Oil & Grease	Analysis: TSS
1AI 01 Micron IN	7/24	8:45A	GRAB	1L	G	1	H_2SO_4		✓	
1AE 01 Micron OUT	7/24	9:45A	GRAB	1L	G	1	H_2SO_4		✓	
1ASI 01 Micron IN	7/24	8:50A	GRAB	250	P	1	—			✓
1ASE 01 Micron OUT	7/24	8:50A	GRAB	250	P	1	—			✓
10AI 10 Micron IN	7/24	9:40A	G	1L	G	1	H_2SO_4		✓	
10AE 10 Micron out	7/24	9:43A	G	1L	G	1	H_2SO_4		✓	
1BE 01 Micron OUT 2	7/24	9:25A	G	1L	G	1	H_2SO_4		✓	
10ASE 10 Micron OUT	7/24	9:51	G	250	P	1	—			✓
10ASI 10 Micron IN	7/24	9:49	G	250	P	1	—			✓
10BE 10 Micron OUT 2	7/24	10:25	G	1L	G	1	H_2SO_4		✓	
~~1BSE~~ 10BSE 10 Micron out 2	7/24	10:27	G	250	P	1	—			✓
1EAI 1 Micron IN	7/24	10:37	G	1L	G	1	H_2SO_4		✓	
1EAE 1 Micron OUT	7/24	10:45	G	1L	G	1	H_2SO_4		✓	
1ESAI 1 Micron IN	7/24	10:50A	G	250	P	1	—			✓
1ESAE 1 Micron OUT	7/24	10:51	G	250	P	1	—			✓
SEE ATTACHMENT 1	for	CONTINUATION								

Special Instructions

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☒ Disposal By Lab ☐ Archive For ____ Months

Turn Around Time Required: ☒ Normal ☐ Rush

QC Level: ☐ I. ☐ II. ☐ III.

Project Specific (Specify)

	Date	Time		Date	Time
1. Relinquished By: Michael Leffler	7/24/97	4:39	1. Received By: Doris Herron	7-24-97	4:40
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

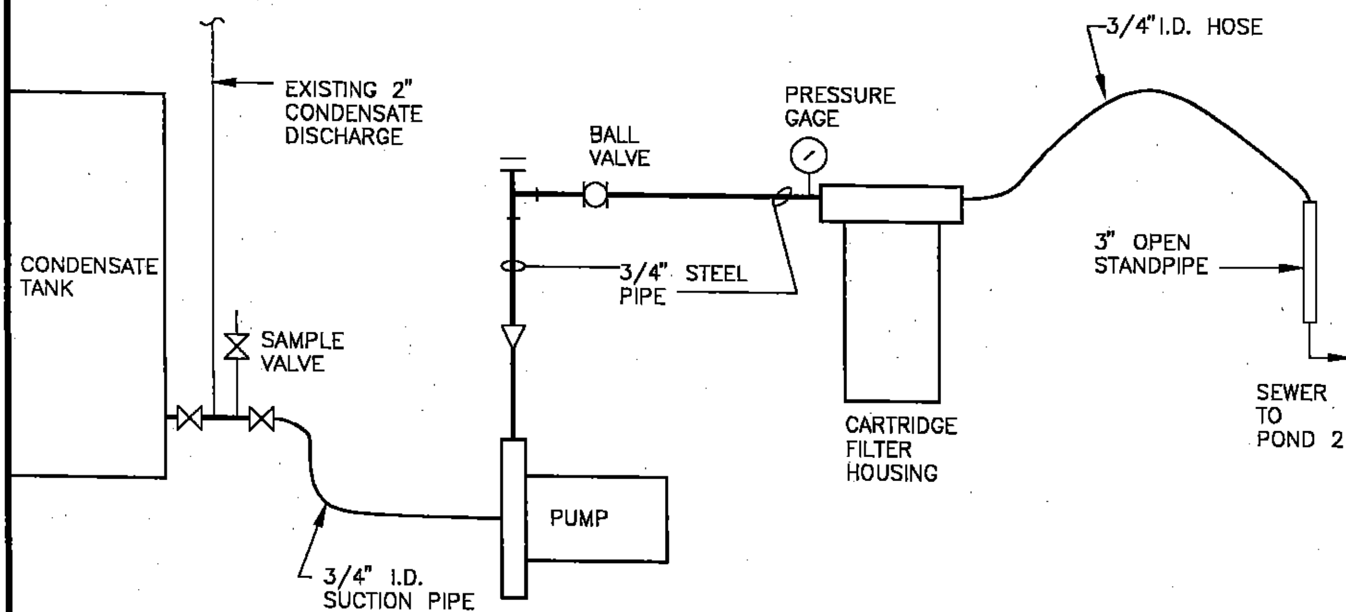
CDF006836

ATTACHMENT I to CHAIN OF CUSTODY 08654
PARSONS ES Mike LEFFLER 7/24/97
Project CANTON DROP FORGE

SAMPLE ID No & DESCRIPT		DATE	TIME	SAMP TYPE	TOT. VOL	CONTAINERS TYPE	NO	PRESERV	CONDITION ON RECEIPT	Oil & Grease
1EBI	1 Micron IN 2	7/24	11:30	G	1L	G	1	H_2SO_4		✓
1EBE	1 Micron OUT 2	7/24	11:34	G	1L	G	1	H_2SO_4		✓
1EBSI	1 Micron IN 2	7/24	11:38	G	250	P	1	—		
1EBSE	1 Micron OUT 2	7/24	11:38	G	250	P	1	—		
1ECE	1 Micron OUT 3	7/24	12:30	G	1L	G	1	H_2SO_4		✓
1ESCE	1 Micron OUT 3	7/24	12:33	G	250	P	1	—		
1EDE	1 Micron OUT 4	7/29	1:20	G	1L	G	1	H_2SO_4		✓
1ESDE	1 Micron OUT 4	7/24	1:30	G	~~1L~~ 250	~~G~~ P	1	—		
1EDSI	1 Micron IN 4	7/24	1:30	G	250	P	1	—		

Doris Warren
7-24-97 @ 4:40

CDF006837



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CANTON DROP FORGE
FILTRATION TESTING EQUIPMENT ARRANGEMENT

31549M01

PARSONS ENGINEERING SCIENCE, INC.

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PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119
PARESCL/897/Dee/MRL4-27

27 August 1997

STARS LONG TERM SAMPLE PLAN FOR O&G

Mr. Keith Houseknecht
Manager, Plant Engineering
CANTON DROP FORGE, INC.
4575 Southway Street
Canton, Ohio 44706

Subject: Condensate Filtration Testing

Dear Mr. Houseknecht:

Parsons Engineering Science (Parsons ES) is pleased to submit this summary of the filtration testing of the low pressure steam condensate which was conducted on 24 July 1997.

Introduction

In May of 1997, Parsons ES conducted a treatability study to evaluate alternatives for reducing the oil and grease content of the condensate for reuse or discharge to the sanitary sewer system. Laboratory testing using a membrane filter indicated that oil and grease concentrations of less than 2 mg/L can be achieved; however, special membranes with reduced performance would be required to process the high temperature condensate. Additional treatability testing done at that time suggested that simple filtration of the condensate was effective in significantly reducing the oil and grease concentration. This further study was conducted to confirm those test results and to establish appropriate design and operating parameters for a filtration system.

Testing

On-site testing of various filters was conducted on 24 July 1997 while the forges were in operation.

Set-up

A filtration testing unit, using a small centrifugal pump connected to a standard 10-inch cartridge filter housing, was assembled. The components were mounted on a portable stand and equipped with a suction hose, discharge hose, filter inlet pressure gage, and a ball valve (between the pump discharge and the filter inlet) to allow control of the pump discharge flow. A Canton Drop Forge pipe fitter modified the discharge of the condensate tank to allow connection of the filtration testing unit suction hose. He also disassembled the connection between the condensate tank discharge hose and the drain so that the testing unit discharge hose could be inserted in the same drain. Four different sizes of 10-inch polymicro cartridge filters were obtained from Filter Specialists, Inc. (FSI) for testing. The filters were rated at 1, 10, 50, and 100 microns. Figure 1 depicts the equipment layout.

Testing

The testing procedure is outlined in Attachment A. The intent was to run three different filter sizes for one hour each and then select a filter for a longer test run. The filter with the smallest size rating which did not exhibit excessive pressure drops was to be selected for the longer run. Since pressure drops across the filter never approached the manufacturer's recommended limit of 10 to 15 psi, with the 1 micron or 10 micron units, the 50 and 100 micron filters were not used.

The condensate tank was essentially emptied on 23 July 1997 prior to modifications of the discharge assembly for the test. Prior to beginning the test the condensate level was estimated at 17 inches by lowering the discharge pipe to the point where flow began. With the tank draw-off nozzle 2.5 inches above the bottom of the tank, the estimated usable volume in the tank for testing was 600 gallons plus the amount added during the testing period. Since the 600-gallon volume was collected in approximately 23 hours, the estimated condensate flow rate averaged 0.4 gpm over the period from the morning of 23 July 1997 to the morning of 24 July 1997.

The testing log is presented in Attachment B. Flows were periodically measured by timing the filling of a container from the discharge hose. The container volume was measured at 1 gallon and 10 ounces when filled with hot water. After running the 1 and 10 micron filters for approximately one hour with no significant pressure build-up a clean one micron filter was installed for extended testing to see how quickly the pressure drop would increase.

After 2.5 hours, when the filter inlet pressure reached 1 psi, oil globules were observed in the discharge. This suggested that oil was being forced through the filter. The test was continued for another hour. At that point, a new 10 micron filter was installed to see if the oil observed passing through the filter might be due to the higher condensate temperature or a change in the influent. The 10 micron filter was operated at a higher flow rate to increase the pressure drop for almost half an hour before the condensate tank went dry. No oil globules were observed in the discharge during this time.

Laboratory Results

Twelve samples were collected during the testing period for analysis for oil and grease, and twelve samples were collected for suspended solids analysis. Influent samples were collected through the sample valve on the discharge of the condensate tank. These samples thus represent the condensate being pumped to the filter and exclude floating oil in the tank. Effluent samples were collected from the end of the filter discharge hose where it discharged into the sewer.

The laboratory results are presented in Attachment C. The full laboratory report is also enclosed. The test parameters along with the laboratory results are summarized in Attachment D. The results indicate that the filters tested were ineffective in reducing the oil and grease and suspended solids in the condensate. The results do, however, show a consistently low oil and grease in the unfiltered condensate during the testing period.

Flow Estimates

Two different means of estimating the condensate flow were used. As mentioned above, the volume accumulated from the morning of 23 July 1997 to the morning of 24 July 1997 was measured. A volume of 600 gallons was collected in approximately 23 hours for an average flow rate of 0.4 gpm.

For a second flow estimate, the total flow removed from the tank during testing (based on the testing times and measured flow rates) was calculated (942 gallons). The change in volume in the tank during the testing (estimated at 559 gallons) was subtracted from the volume used in the tests to obtain the volume of condensate added during the period (383 gallons). This volume was divided by the length of time between the initial volume measurement (before testing began) and final volume measurement (after testing was complete) which was 6.43 hours. The condensate flow rate thus calculated was 0.99 gpm.

Conclusions and Recommendations

Suitability to purpose of simple filtration

Based on these test results, simple filtration does not significantly improve the condensate quality. The appearance of the oil globules in the effluent during the extended test suggests that oil collected on the filter is forced through at a relatively low pressure drop across the filter. Even before this occurred and with the 1 micron filter (the smallest size rating testing), the laboratory results indicate that neither oil and grease nor suspended solids removal was appreciable.

This is significantly different from the results of the laboratory filtration tests conducted in the previous study. Although the quantitative testing done at that time indicated a low oil and grease concentration in the condensate, filtration through a 10-micron filter indicated significant reduction (approximately 50%). This was further supported by the qualitative tests where filtration through a relatively coarse filter produced a clear filtrate. One possible explanation for the difference is that the earlier testing was performed on an aged sample that was at ambient temperature. The changes that occurred in concentration and nature of the oil and grease during the period between the collection of the sample and the performance of the tests are unknown (two days for the qualitative tests and eight days for the quantitative tests). The lower temperature of the condensate during the previous filtration tests may be a significant factor.

Recommended Alternative

The laboratory analysis consistently indicated an oil and grease concentration in the untreated condensate of approximately 50 mg/l. This is lower than previous analysis has shown (258 mg/L on 13 May 1997), however, four samples collected within a few hours all show similar values. One reason for the significantly lower oil and grease may be that the condensate tank was reportedly cleaned during the week of 7 July 1997. The current samples were collected during the second week of operation after the tank was cleaned, while the earlier sample was collected after the tank had been in operation for approximately four months. If this is representative of the normal oil and grease concentration, then the condensate may be suitable for direct discharge to the sanitary sewer.

REPORT NOT TRUE

Canton Drop Forge is located in Stark County, and discharges to a County sanitary sewer; however, the wastewater is treated at the City of Massilon wastewater treatment. Therefore, Canton Drop Forge's wastewater discharge may be subject to restrictions imposed by both Stark County and the City of Massilon. The City of Massilon sewer ordinances prohibit the discharge of water or wastes containing free oils, emulsified oils, and grease exceeding an average of 100 parts per million into the City wastewater collection and treatment system. The Stark County sewer regulations, however, limit the oil and grease discharge to 50 mg/L.

Since local limits apply to the total industrial wastewater discharge at the point of connection to the public sewer system, the limits apply to the combined wastewater discharge which would include the hot process softener blowdown and the condensate. When mixed with the hot process softener blowdown, which has been measured at 17 gpm, either limit should be easily satisfied with the oil and grease levels measured in this study. Based on the observed blowdown and condensate flow rates, peak oil and grease concentrations in the condensate should not result in exceedance of the discharge limits.

To minimize the oil and grease discharge to the sanitary sewer system, the condensate tank should be maintained and operated at maximum water level, and an oil skimmer similar to that used on Pond 2 (with high temperature tubing) should be installed to remove any oil which does separate in the tank. To assure consistent blending of the waste streams, the condensate could be introduced in the influent of the clarifier being contemplated for the hot process softener blowdown. Depending on the type of clarifier provided, removal of additional oil could occur during the extended time provided for gravity separation of any floatable oils. Some oil removal could also occur due to adsorption on the calcium carbonate sludge removed in the clarifier. The alternatives of discharging the condensate to the inlet or discharge of the clarifier should be evaluated. The advantages of discharging ahead of the clarifier are the more uniform blending of the waste streams for a more consistent discharge and the potential for additional removal. Approval by local authorities for the discharge to the public sewer may be more easily obtained with one clarifier discharge as opposed to two discharges blended together. The disadvantages are that oil adsorbed on the clarifier sludge may impact the ultimate disposal of the sludge and the additional flow (probably minimal impact) must be considered in the clarifier design.

This alternative appears to be preferable to other identified alternatives. The previous study indicated that a membrane filtration system could reduce oil and grease to low levels, but installation, operation, and maintenance of the system would be expensive. There were also issues to be resolved because of the high temperature of the condensate. Studies by others have determined that polymers can be used to separate the oil and grease, but such systems require additional labor for operation as well as the chemical expenses.

Conclusions

Although the testing results were disappointing, the testing does indicate that discharge to the sanitary sewer is a promising alternative. Considering that the sanitary sewer limitations apply to the total industrial wastewater flow at the point of discharge to the public sewer, the low flow rate of the condensate, and the oil and grease concentrations measured in this study, it appears that the County and City sewer discharge limitations can be met without pretreatment. By maximizing the opportunity for oil and grease removal in the existing condensate tank and possibly discharging the condensate to the new clarifier being designed for the hot process softener blowdown, the amount of oil and grease discharged to the sewer can be minimized. To confirm the viability of this option, talks should be initiated with the

County and/or City to define exact requirements, connection fees, and sewer charges that would be involved. Canton Drop Forge may also want to collect additional condensate samples over a period of time for oil and grease analysis to better define the normal and peak concentrations encountered. Additional flow measurements would also be useful. The City or County may require additional analysis before accepting the waste.

If you have any questions or wish to discuss this report, please do not hesitate to call.

Very truly yours,

PARSONS ENGINEERING SCIENCE

Michael R. Leffler, P.E.
Associate

MRL/dee
cc: File731549

Attachment A
Canton Drop Forge
Condensate Filtration Testing Procedure

I. Procedure

A. Set up equipment

B. Four runs (one for each filter size plus one extended)

1. Start-up System

a) Set Pumping Rate

b) Collect initial data

(1) Record filter inlet pressure

(2) Measure flow

(3) Sample inlet oil & grease (O&G) and suspended solids (TSS)

(4) Sample effluent O&G and TSS

2. Run for one half hour

a) Record pressure every 10 minutes

b) Collect data

(1) Measure flow

3. Continue running for one hour total

a) Record pressure every 10 minutes

b) Collect data near end of run

(1) Measure flow

(2) Sample effluent O&G and TSS

4. **Repeat for other two filter sizes**

5. **Run longer test on one filter**

   a) ***Select smallest filter that is apparently acceptable***

   b) ***Run as long as possible***

   c) ***Set Pumping Rate***

   d) ***Collect initial data***

      (1) Record inlet pressure

      (2) Measure flow

      (3) Sample inlet oil & grease and suspended solids

      (4) Sample effluent O&G and TSS

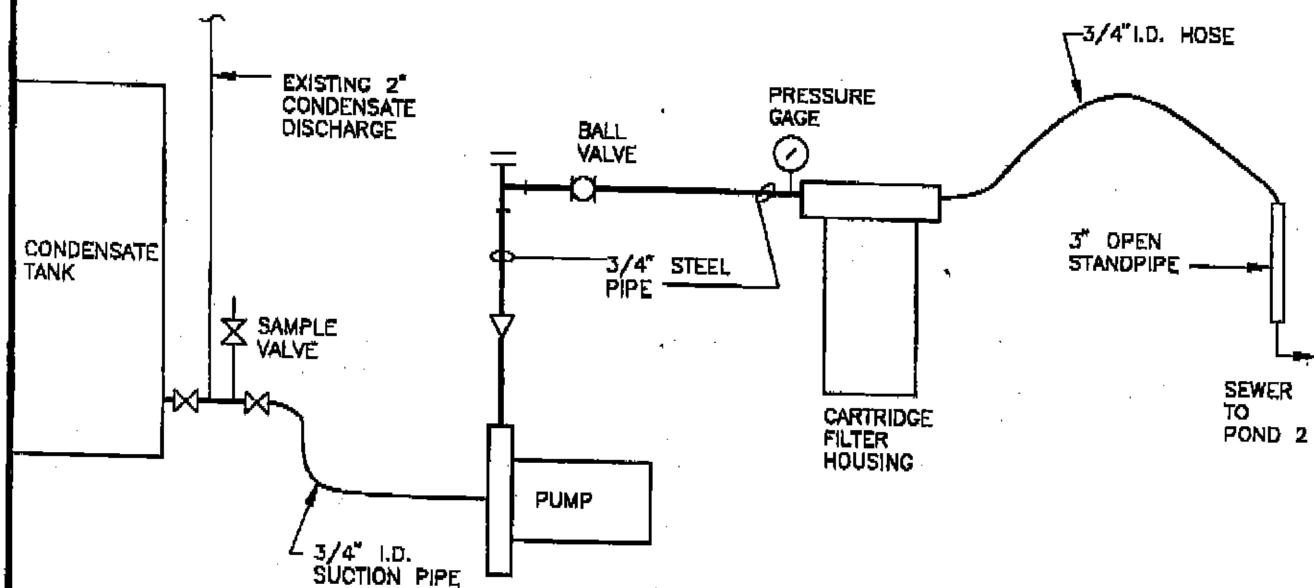
   e) ***Record pressure every 15 minutes***

   f) ***Measure flow every half hour***

   g) ***At end of run***

      (1) Sample effluent O&G and SS

FIGURE 1



CANTON DROP FORGE
FILTRATION TESTING EQUIPMENT ARRANGEMENT

31549M01

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PARSONS ENGINEERING SCIENCE, INC.

Attachment B
Canton Drop Forge
Condensate Filtration Testing Log

Date:	7/24/97							
Filter Size:	01 Micron							
Notes:								
				Oil & Grease		TSS		
		Sample	ID	In	Out	In	Out	
Start Time:	8:37	In 1	1AI/1ASI	41		140		
End Time:	9:30							
Run Time:	0:53	Out 1	1AE/1ASE		37		120	
Run Gallons:		Out 2	1BE		34			
Pressure Drop:								

Time	Inlet Pressure	Container Size	Seconds to fill	Flow Rate	Total Flow	Infl Temp	Effl Temp	Notes
	(psi)	(gal)	(sec)	(gpm)	(gal)	(deg C)	(deg C)	
8:37	0	1.08	37	1.75			45.7	
8:45	0			1.80	14.21			Samples 1AI & 1AE
8:48	0			1.80	19.62	42		
8:50	0			1.80	23.22			Samples 1ASI & 1ASE
8:53	0	1.08	35	1.85	28.70			
8:57	0	1.08	25	2.59	37.58			Flow readjusted
9:00	0			2.59	45.36	38.4		
9:04	0			2.59	55.73		47.4	Effl colored but cleaner looking than infl. Zero to slight sheen.
9:05	0	1.08	25	2.59	58.32			
9:17	0.25	1.08	25	2.59	89.42		49.1	
9:22	0.25			2.59	102.38	41.2		Some oil globules in infl.
9:25	0.25			2.59	110.16		48.1	Sample 1BE
9:29	0.25	1.08	25	2.59	120.53			

Stopped at 9:30. Lot of oily water in filter housing.
Filter well coated outside.

Attachment B
Canton Drop Forge
Condensate Filtration Testing Log

Date:	7/24/97							
Filter Size:	10 Micron							
Notes:								
				Oil & Grease		TSS		
		Sample	ID	In	Out	In	Out	
Start Time:	9:35	In 1	10AI/10A	54		140		
End Time:	10:30							
Run Time:	0:55	Out 1	10AE/10ASE		32		140	
Run Gallons:		Out 2	10BE/10BSE		34		120	
Pressure Drop:								

Time	Inlet Pressure (psi)	Container Size (gal)	Seconds to fill (sec)	Flow Rate (gpm)	Total Flow (gal)	Infl Temp (deg C)	Effl Temp (deg C)	Notes
9:35	0	1.08	27	2.40				
9:40	0			2.50	12.24	48.6		Sample 10AI
9:43	0			2.50	19.73		49	Sample 10AE
9:49	0			2.50	34.70			Sample 10ASI
9:51	0			2.50	39.70			Sample 10ASE
9:55	0	1.08	25	2.59	49.87		50.1	Effl colored—some oil on top—not continuous sheen, but many, many spots.
10:15	0.125			2.59	101.71			
10:20	0.125	1.08	25	2.59	114.67		51.7	
10:25				2.59	127.63			Sample 10BE
10:27				2.59	132.81			Sample 10BSE
10:30	0.125			2.59	140.58			Stopped Test. Filter evenly coated.

Attachment B
Canton Drop Forge
Condensate Filtration Testing Log

Date:	7/24/97							
Filter Size:	01 Micron extended run							
Notes:								
				Oil & Grease		TSS		
		Sample	ID	In	Out	In	Out	
Start Time:	10:35	In 1	1EAI/1ESAI	48		140		
End Time:	13:55	In 2	1EBI/1EBSI	48		180		
Run Time:	3:20	In 3	1ESDI					
Run Gallons:		Out 1	1EAE/1ESAE		50		130	
Pressure Drop:		Out 2	1EBE/1EBSE		47		170	
		Out 3	1ECE/1ESCE		34		160	
		Out 4	1EDE/1ESDE		54		220	

Time	Inlet Pressure (psi)	Container Size (gal)	Seconds to fill (sec)	Flow Rate (gpm)	Total Flow (gal)	Infl Temp (deg C)	Effl Temp (deg C)	Notes
10:35		1.08	23	2.82				
10:37				2.88	5.70	51		Sample 1EAI
10:45				2.88	28.75		51.6	Sample 1EAE
10:50				2.88	43.16			Sample 1ESAI
10:51				2.88	46.04			Sample 1ESAE
10:53		1.08	22	2.95	51.87			
11:00	0.25	1.08	22	2.95	72.48		54.5	
11:11				2.95	104.88			Sheen about the same as in 10 micron
11:27	0.5	1.08	22	2.95	152.01			
11:30				2.95	160.85	56.1		Sample 1EBI
11:34				2.95	172.63		56	Sample 1EBE
11:38				2.95	184.41			Samples 1EBSI and 1EBSE
11:52	0.5			2.95	225.65			
12:05	0.5	1.08	22	2.95	263.94		60.1	Influent looks same as before
12:15		5	105	2.86	292.95			
12:25	0.75			2.90	321.74			Infl looks same, but flow is small--probably reaching level of sample point
12:30				2.90	336.25		61.1	Samples 1ECE
12:33				2.90	344.95			1ESCE
12:36	0.875	1.08	22	2.95	353.72			
12:43	1			2.88	374.12			No infl sample available
12:49	1			2.88	391.41			
12:53	1	1.08	23	2.82	402.80		63.6	Oil globules in effluent
13:02	1			2.88	428.45	60.3		Obtained influent sample by removing U-tube from sample discharge. Looks same as before. Less oil globules than in effluent.
13:10	1	1.08	22	2.95	451.76			
13:18	1.125			2.88	475.06			Infl same. Slightly darker color
13:28	1.125	1.08	23	2.82	503.56		63.3	Sample 1EDE
13:33	1.25			2.82	517.65			Infl same; effl--more oil globules
13:38	1.25			2.82	531.73			Samples 1ESDE and 1ESDI
13:45	1.5	1.08	23	2.82	551.45		64.7	
13:53	1.5	1.08	23	2.82	573.99			
13:55				2.82	579.63			Stop test. Coating of filter looked heavy when wet, but after drying does not look as heavy as first run.

Attachment B
Canton Drop Forge
Condensate Filtration Testing Log

Date:	7/24/97							
Filter Size:	10 Micron							
Notes:								
		Sample	ID		O&G	TSS		
Start Time:	14:00	In 1						
End Time:	14:26							
Run Time:	0:26	Out 1						
Run Gallons:		Out 2						
Pressure Drop:								

Time	Inlet Pressure (psi)	Container Size (gal)	Seconds to fill (sec)	Flow Rate (gpm)	Total Flow (gal)	Infl Temp (deg C)	Effl Temp (deg C)	Notes
14:00	0.5	1.08	18	3.60				Few globules in effluent sample
14:04				3.83	14.85			Infl level at top of 1/2" pipe
14:22	0.5			3.83	83.70			No oil globules—similar to previous 10 micron run
14:24	0.7	1.08	16	4.05	91.57			
14:26	0.7			4.05	99.67			Stopped test when pump broke suction (as influent sample valve was opened). After stopping, water in tank high enough to come out influent sample elbow. Infl similar to before—a few oil globules. Filter lightly coated.

Attachment C
Canton Drop Forge
Condensate Filtration Testing
Laboratory Results

Sample ID	Description	Time	Run	O&G (mg/L)	TSS (mg/L)
1AI	01 Micron in	8:45	1--1 Micron	41	
1AE	01 Micron out	8:45	1--1 Micron	37	
1ASI	01 Micron in	8:50	1--1 Micron		140
1ASE	01 Micron out	8:50	1--1 Micron		120
1BE	01 Micron out 2	9:25	1--1 Micron	34	
10AI	10 Micron in	9:40	2--10 Micron	54	
10AE	10 Micron out	9:43	2--10 Micron	32	
10ASI	10 Micron in	9:49	2--10 Micron		140
10ASE	10 Micron out	9:51	2--10 Micron		140
10BE	10 Micron out 2	10:25	2--10 Micron	34	
10BSE	10 Micron out 2	10:27	2--10 Micron		120
1EAI	1 Micron in	10:37	3--1 Micron extended	48	
1EAE	1 Micron out	10:45	3--1 Micron extended	50	
1ESAI	1 Micron in	10:50	3--1 Micron extended		140
1ESAE	1 Micron out	10:51	3--1 Micron extended		130
1EBI	1 Micron in 2	11:30	3--1 Micron extended	48	
1EBE	1 Micron out 2	11:34	3--1 Micron extended	47	
1EBSI	1 Micron in 2	11:38	3--1 Micron extended		180
1EBSE	1 Micron out 2	11:38	3--1 Micron extended		170
1ECE	1 Micron out 3	12:30	3--1 Micron extended	34	
1ESCE	1 Micron out 3	12:33	3--1 Micron extended		160
1EDE	1 Micron out 4	13:28	3--1 Micron extended	54	
1ESDE	1 Micron out 4	13:38	3--1 Micron extended		220
1ESDI	1 Micron in 4	13:38	3--1 Micron extended		310

Attachment D
Canton Drop Forge
Condensate Filtration Testing Summary

Test No.	Filter size	Duration	Total Flow	Avg flow rate	Max Pressure Drop	Flow at Max Press Drop	
	(microns)	(hr:min)	(gal)	(gpm)	(psi)	(gpm)	
1	1	0:53	120.53	2.27	0.25	2.59	
2	10	0:55	140.58	2.56	0.125	2.59	
3	1	3:20	579.63	2.90	1.5	2.82	
4	10	0:26	99.67	3.83	0.7	4.05	
		Oil & Grease (mg/L)		TSS (mg/L)		Temp. (degrees C)	
Test No.	Elapsed* Time (min)	In	Out	In	Out	In	Out
1	8 to 13	41	37	140	120	42	45.7
	48		34				48.1
2	5 to 11	54	32	140	140	48.6	49
	50 to 52		34		120		51.7
3	2 to 16	48	50	140	130	51	51.6
	55 to 63	48	47	180	170	56.1	56
	115 to 118		34		160		61.1
	172 to 183		54	310	220	60.3	63.3

* Time from start of test to when sample was collected. Two numbers indicate range of time over which samples were taken.

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

330 497-9396 Telephone
330 497-0772 Fax

Quanterra
Environmental
Services

ANALYTICAL REPORT

PROJECT NO. 2693

BORROW SITE

Lot #: A7K120147

Gordon Hanlon

Beaver Excavation

QUANTERRA INCORPORATED

David S. Heakin
Project Manager

November 20, 1997

CDF006853

CASE NARRATIVE

The following report contains the analytical results for two solid samples submitted to Quanterra-North Canton by Beaver Excavation from the Borrow Site. The samples were received November 12, 1997, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Gordon Hanlon on November 19, 1997.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

Supplemental QC Information

SAMPLE RECEIVING

The samples were received at a temperature of 15.8° C.

ANALYTICAL METHODS SUMMARY

A7K120147

PARAMETER	ANALYTICAL METHOD
Total Residue as Percent Solids	MCAWW 160.3 MOD
TCLP Mercury (CVAA)	SW846 7470
TCLP Metals (ICP)	SW846 6010A

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

A7K120147

WO #	SAMPLE#	CLIENT SAMPLE ID	DATE	TIME
CE0V7	001	SOUTH SIDE STOCKPILE	11/11/97	00:00
CE0V9	002	NORTH SIDE STOCKPILE	11/11/97	00:00

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

BEAVER EXCAVATION

Client Sample ID: SOUTH SIDE STOCKPILE

TCLP Metals

Lot-Sample #...: A7K120147-001 **Matrix.......:** SOLID
Date Sampled...: 11/11/97 00:00 **Date Received..:** 11/12/97
Leach Date.....: 11/14/97 **Leach Batch #..:** P731706

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 7318124						
Arsenic	ND	1.5 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE0V7102
Barium	ND	60.0 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE0V7103
Cadmium	ND	0.15 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE0V7104
Chromium	ND	3.0 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE0V7105
Lead	ND	1.5 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE0V7106
Selenium	ND	1.0 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE0V7107
Mercury	ND	0.060 Dilution Factor: 1	mg/L	SW846 7470	11/14-11/17/97	CE0V7108

NOTE(S):

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching Procedure Method 1311 (55 FR 26986)

BEAVER EXCAVATION

Client Sample ID: NORTH SIDE STOCKPILE

TCLP Metals

Lot-Sample #...: A7K120147-002 **Matrix.......:** SOLID
Date Sampled...: 11/11/97 00:00 **Date Received..:** 11/12/97
Leach Date.....: 11/14/97 **Leach Batch #..:** P731706

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 7318124						
Arsenic	ND	1.5 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE0V9102
Barium	ND	60.0 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE0V9103
Cadmium	ND	0.15 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE0V9104
Chromium	ND	3.0 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE0V9105
Lead	ND	1.5 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE0V9106
Selenium	ND	1.0 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE0V9107
Mercury	ND	0.060 Dilution Factor: 1	mg/L	SW846 7470	11/14-11/17/97	CE0V9108

NOTE(S):

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching Procedure Method 1311 (55 FR 26986)

QUALITY CONTROL SECTION

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra® Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the MS/MSD RPDs are within acceptance criteria, the batch is acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

** for analyses run on TJA Trace ICP or GFAA only*

QUALITY CONTROL ELEMENTS OF SW-846 METHODS
(Continued)

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty fold less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If, in the analyst's judgment, sample matrix effects are indicated, no corrective action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The acceptance criteria do not apply to samples that are diluted. If the dilution is more than 5X, the recoveries will be reported as diluted out. All other surrogate recoveries will be reported. If the LCS, LCSD, or the Method Blank surrogates fail to meet recovery criteria (exception for dilutions), the entire batch of samples is reprepared and reanalyzed.

If the surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank and the associated sample(s) are ND, the batch is acceptable. If the surrogate recoveries are outside criteria for environmental or MS/MSD samples, the batch may be acceptable based on the analyst's judgment that sample matrix effects are indicated.

For the GC/MS BNA methods, the surrogate criteria is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide/PCB, PAH, TPH, and Herbicide methods, the surrogate criteria is that one of two surrogate compounds meet acceptance criteria.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TCLP Metals

Client Lot #...: A7K120147 **Matrix.........:** SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: A7K140000-124 **Prep Batch #...:** 7318124					
Cadmium	111	(50 - 150) Dilution Factor: 1	SW846 6010A	11/14-11/16/97	CE1NJ10A
Chromium	109	(50 - 150) Dilution Factor: 1	SW846 6010A	11/14-11/16/97	CE1NJ10C
Lead	106	(50 - 150) Dilution Factor: 1	SW846 6010A	11/14-11/16/97	CE1NJ10D
Selenium	104	(50 - 150) Dilution Factor: 1	SW846 6010A	11/14-11/16/97	CE1NJ10E
Mercury	91	(50 - 150) Dilution Factor: 1	SW846 7470	11/14-11/17/97	CE1NJ10F
Arsenic	105	(50 - 150) Dilution Factor: 1	SW846 6010A	11/14-11/16/97	CE1NJ108
Barium	98	(50 - 150) Dilution Factor: 1	SW846 6010A	11/14-11/16/97	CE1NJ109

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

TCLP Metals

Client Lot #...: A7K120147 **Matrix.........:** SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: A7K130000-226		**Prep Batch #...:** 7318124				
Leach Date.....: 11/14/97		**Leach Batch #..:** P731706				
Arsenic	ND	1.5 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE1DT101
Barium	ND	60.0 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE1DT102
Cadmium	ND	0.15 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE1DT103
Chromium	ND	3.0 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE1DT104
Lead	ND	1.5 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE1DT105
Selenium	ND	1.0 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE1DT106
Mercury	ND	0.060 Dilution Factor: 1	mg/L	SW846 7470	11/14-11/17/97	CE1DT107

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

TCLP Metals

Client Lot #...: A7K120147 **Matrix.........:** SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: A7K140000-124 **Prep Batch #...:** 7318124						
Arsenic	ND	1.5 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE1NJ101
Barium	ND	60.0 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE1NJ102
Cadmium	ND	0.15 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE1NJ103
Chromium	ND	3.0 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE1NJ104
Lead	ND	1.5 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE1NJ105
Selenium	ND	1.0 Dilution Factor: 1	mg/L	SW846 6010A	11/14-11/16/97	CE1NJ106
Mercury	ND	0.060 Dilution Factor: 1	mg/L	SW846 7470	11/14-11/17/97	CE1NJ107

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

TCLP Metals

Client Lot #...: A7K120147 **Matrix.........:** SOLID
Date Sampled...: 11/11/97 00:00 **Date Received..:** 11/12/97

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: A7K120147-001 **Prep Batch #...:** 7318124							
Leach Date.....: 11/14/97 **Leach Batch #..:** P731706							
Arsenic	106	(50 - 150)			SW846 6010A	11/14-11/16/97	CE0V7109
	110	(50 - 150)	3.3	(0-20)	SW846 6010A	11/14-11/16/97	CE0V710A
		Dilution Factor: 5					
Barium	96	(50 - 150)			SW846 6010A	11/14-11/16/97	CE0V710C
	100	(50 - 150)	4.1	(0-20)	SW846 6010A	11/14-11/16/97	CE0V710D
		Dilution Factor: 5					
Cadmium	107	(50 - 150)			SW846 6010A	11/14-11/16/97	CE0V710E
	112	(50 - 150)	4.2	(0-20)	SW846 6010A	11/14-11/16/97	CE0V710F
		Dilution Factor: 5					
Chromium	103	(50 - 150)			SW846 6010A	11/14-11/16/97	CE0V710G
	107	(50 - 150)	3.9	(0-20)	SW846 6010A	11/14-11/16/97	CE0V710H
		Dilution Factor: 5					
Lead	104	(50 - 150)			SW846 6010A	11/14-11/16/97	CE0V710J
	108	(50 - 150)	4.0	(0-20)	SW846 6010A	11/14-11/16/97	CE0V710K
		Dilution Factor: 5					
Selenium	106	(50 - 150)			SW846 6010A	11/14-11/16/97	CE0V710L
	110	(50 - 150)	3.6	(0-20)	SW846 6010A	11/14-11/16/97	CE0V710M
		Dilution Factor: 5					
Mercury	98	(50 - 150)			SW846 7470	11/14-11/17/97	CE0V710N
	96	(50 - 150)	1.5	(0-20)	SW846 7470	11/14-11/17/97	CE0V710P
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

THE BEAVER EXCAVATING CO.
4650 Southway St. SW
P.O. Box 6059
CANTON, OHIO 44706

(330) 478-2151
FAX (330) 478-2122

LETTER OF TRANSMITTAL

DATE 11-11-97 JOB NO. 2693

ATTENTION

RE: Soil Samples for Testing - TCLP/Metals

TO

Quanterra Inc.
4101 Shuffel Dr. N.W

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via ____________ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☒ Samples ☒ Specifications

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☐ As requested ☐ Returned for corrections ☐ Return ______ corrected prints

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☐ FOR BIDS DUE ____________ 19 ______ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS
X Dan Torsoc 11/12/97 8:00 AM
2 (two samples)

Rec'd Mrg Neuman 11/12/97 Rush

Kim D Hartin 11/12/97 0905 Am

COPY TO Stan Evans

CDF006866

SIGNED: D. Torsoc

If enclosures are not as noted, kindly notify us at once.

Testing Lab!

2.03 CHEMICAL SCREENING

The Contractor shall submit for approval test results showing that the fly ash has been tested and shown to be nontoxic in accordance with the requirements of the Ohio EPA Policy DSW 0400.007 'Beneficial Use of Nontoxic Bottom Ash, Fly Ash, and Spent Foundry Sand, and Other Exempt Wastes." The fly ash shall be characterized using the Toxicity Characteristic Leaching Procedure (TCLP, USEPA Method 1311). The nontoxic criteria is as follows:

HAZARDOUS TESTING

Parameter	Nontoxic Criteria, mg/L
Arsenic	1.5
Barium	60.0
Cadmium	0.15
Chromium	3.0
Lead	1.5
Mercury	0.06
Selenium	1

2(b)
3

DRAFT

CANTON DROP FORGE, INC.
LAGOON #1 RE-CONSTRUCTION/BIOCELL DISPOSAL
SUMMARY REPORT OF FEASIBILITY ANALYSES

Based on our Scope of Work for the entitled project, Parsons Engineering Science, Inc. (Parsons ES) respectfully submits to Canton Drop Forge, Inc. (CDF) this report. In the sections which follow, we summarize the results of the environmental and geotechnical analyses completed, the feasibility of several alternative approaches considered, and the conceptual design, budgetary cost estimate and preliminary schedule for implementing the recommended option for addressing the re-construction of Lagoon #1 and disposition of the biocell material.

SUMMARY OF CURRENT CONDITIONS

Sampling and Analysis Plan

Prior to sampling, a square grid pattern was lain over a copy of the map of the area which contained the material removed from Lagoon #1, i.e., the biocell (see Figure 1). The area of each grid section was 900 square feet (30 feet by 30 feet). A discrete number was given to each of the grid intersections (there are 77 intersection). A random number generator was then used to pick ten (10) grid intersection points which were then sampled in the field and submitted for analytical/environmental analysis. The samples were labeled CDF-1 through CDF-10. In addition, seven discrete sampling locations inside various grids were sampled and composited for geotechnical analysis. The sampling locations were labeled Geotech-1 through Geotech-7.

Samples which were obtained for analytical/environmental analyses were collected via hand at each selected sampling grid location. Samples were collected from approximately 0.5 feet below grade at each sample location. Sample material was placed directly into laboratory grade jars, sealed with screw-on Teflon-lined lids, place on ice in a cooler and transported to the laboratory. The samples were transported under chain-of-custody procedures to GeoAnalytical, Inc. laboratories in Twinsburg, Ohio for environmental and chemical analyses. Soil samples were analyzed following the Voluntary Action Program (VAP) protocol for total petroleum hydrocarbons, middle range organics (TPH-MRO, EPA method SW846-4015A (modified)), total petroleum hydrocarbons heavy range organics (TPH-HRO, EPA method SW846-4015A (modified)), TPH (EPA method 418.1), and semi-volatile organic compounds (SVOCs, EPA method SW846-8270B). Table 1 summarizes the analytical methods used for this effort.

The soil sample obtained for geotechnical analyses represented a composite of seven sampling locations (e.g., Geotech-1 through Geotech-7). Samples were collected from approximately 0.5 feet below grade at each sample location and placed in a 5-gallon bucket with a sealed lid. The sample material was transported to Applied Construction Technologies, Inc. (ACT) in Cleveland, Ohio for analysis and treatability testing. The composited sample material was mixed with varying amounts of lime and fly ash and subjected to the California Bearing Ratio test (ASTM D1883) to determine the resulting materials' relative bearing capacities. Four test runs were made, one each for the following soil, lime and fly ash mixtures:

- Biocell material with no lime and no fly ash;
- Biocell material with 2% lime and 10% fly ash;
- Biocell material with 6% lime and 22.5% fly ash; and
- Biocell material with 10% lime and 35% fly ash.

Results of Analyses

Table 2 presents the results of analytical and environmental testing for the soil samples collected for chemical analysis. Table 2 only summarizes compounds which were detected during analysis. The complete analytical reports received from GeoAnalytical, Inc. have been included as Appendix A. Please note that the "VAP Limits for Industrial Use Properties" displayed in Table 2 may only be used if the biocell material is deposited between two confining clay layers with vertical hydraulic conductivity of less than 10^{-5} cm/sec. If the biocell materials are enplaced in any other configuration, more conservative VAP limits will apply. It should also be noted that the oily nature of the sampled material caused matrix interference in the laboratory, producing elevated detection limits for SVOCs.

Results of geotechnical analyses and treatability testing are summarized in the table contained in Appendix B. These indicate that, for the soil, lime and fly ash mixtures tested, the second case (i.e., with 2% lime and 10% fly ash) produced the most desirable results. Please note that this mixture is not necessarily the ***optimal*** result; subsequent discussions with the laboratory have indicated that slightly lower additions of lime and fly ash may produce a mixture with an adequate bearing capacity.

Implications of Analytical Results

Implications of the environmental and chemical analytical results are such that the material contained in the biocell should be suitable for application following the guidance of the VAP regulations. There are no compounds, which are required to be analyzed under VAP, with values exceeding the limits provided in VAP's Generic Numerical Standards for industrial use properties [OAC 3745-300-08]. To apply these limits, CDF must agree to maintain this property in industrial use in perpetuity. Also, in the future, should CDF decide to obtain closure of this property (or the portion being addressed in this project), the entire VAP protocol must be completed, resulting in issuance of a No Further Action (NFA) Letter by a Certified Professional and, if desired, a Covenant Not To Sue (CNS) by Ohio EPA.

Implications of the geotechnical analytical and treatability testing results are that, in order to maintain structural integrity in future applications (see specifically options b, c, and f below), stabilization with lime and fly ash is required. Please note that the long-term effects of certain applications, i.e., specifically as wearing surfaces in track or roadway and parking applications, have not been tested and are difficult to predict. For example, CDF should be aware that exposure to traffic and the elements (e.g., sunlight, precipitation, etc.) may result in physical or chemical changes in the stabilized soil mixture, resulting in potentially undesirable effects.

RCRA characterization testing (previously completed by Hammontree & Associates, prior to removal of the biocell material from Lagoon #1) indicated that the material was non-hazardous. Hence, the options presented below are considered feasible without the need for pretreatment for environmental risk reduction (i.e., fixation to prevent leaching should not be required).

FEASIBILITY ANALYSES

FOIA Review for VAP Applicability

Based on information from Mr. Richard Zollinger, Esq. of CDF, the Freedom of Information Act (FOIA) searches conducted at Twinsburg (Ohio EPA, Northeast Ohio District), Columbus (Ohio EPA, Headquarters) and Chicago (US EPA, Region V) produced no information that would prohibit use of a VAP approach for disposition of biocell material and/or re-construction of Lagoon #1. Consequently, based on the results of the FOIA searches and the environmental sampling and analyses summarized above, it has been determined that application of the VAP regulatory framework should provide guidance, which is acceptable to the major stakeholders (i.e., Ohio EPA, CDF), for this project.

Further review of CDF's operating and regulatory history has indicated that, at one time or another (but not necessarily currently), other regulatory frameworks may have been applicable. For instance, the underground storage tanks (USTs), at least one (of three) has since been removed, are operated under the jurisdiction of the Bureau of Underground Storage Tank Regulations (BUSTR). Also, the landfill, which was located in the vicinity of the biocell and has since been closed, was possibly regulated under the Resource Conservation and Recovery Act (RCRA). Additionally, the Ohio EPA's Master Sites List (MSL) includes the CDF property (EPA ID no. OHD004465142) as a "low priority" site, included in the MSL since 1985 due to an "oily wastes" problem. In any case, even with these additional regulatory considerations in the background, it appears reasonable to follow VAP guidance for the current project. It should be noted, however, that several additional steps, i.e., Phase I property assessment, NFA Letter, etc., are required before the Lagoon #1 and biocell areas of the CDF property can be considered "closed" under VAP guidance. In other words, completion of these actions will not result in a regulatory closure of this portion of the CDF property. These proposed actions have been developed consistent with the requirements of VAP, should CDF choose to seek closure in the future.

Alternative Approaches

In view of the potentially appropriate alternatives for the disposal of material contained in the biocell and concurrent re-construction of Lagoon #1, Parsons ES has considered the following approaches:

a) transportation to and disposal of the biocell material in an appropriately licensed off-site landfill;

b) stabilization, as described above for structural integrity, and deposition in an on-site area, which will later be re-surfaced with asphalt for parking;

c) stabilization, as described above for structural integrity, and deposition in an on-site area, which will be used as a track or roadway around the inside perimeter of the property;

d) transportation and sale to Ashland's Refinery in Canton for use as a feed-stock;

e) transportation and sale to a local asphalt plant for use as a feed-stock; and

f) stabilization, as described above for structural integrity, and deposition in an appropriate manner (see following section) in Lagoon #1 as part of the back-fill required to reduce the pond's capacity to that required for storm water management.

It should be noted that, in re-constructing Lagoon #1 for alternatives a, b, c, d, and e above, additional volumes of clean fill material (beyond that which may be required for option f), will be required in lieu of the volume of biocell material which is being used or disposed elsewhere and of the clay used to provide a lining under the layer of biocell material (enplaced in option f). Also, in all cases, a small, incremental volume of oil-impacted soil and water in Lagoon #1 must be removed prior to initiating any re-construction activities. Parsons ES proposes that, subject to CDF approval and subsequent to recovery of any free oil, the additional oily soil and water be transferred to the biocell and Lagoon #2, respectively. Finally, except for the nature of an internal layer of biocell material (as in option f), the emplacement sequence for re-construction of Lagoon #1 would be similar for all options listed above:

- clay layer;
- biocell material (option f only);

- clay layer (option f only);
- HDPE liner (optional, if required); and
- stabilization layer (optional, if required).

Please note that for options a through e, clean fill may be substituted for the lower clay layer indicated above.

Screening Criteria

As indicated in our Scope of Work, the following criteria were used to screen the alternatives listed previously: economic impact (i.e., overall costs); scheduling impact; technical feasibility (i.e., implementability); stakeholder (i.e., regulatory agency, customer, neighbor, stockholder) acceptability; and permitting requirements. Table 3 provides a summary of the screening criteria definitions (see footnotes). Additional details concerning the definitions of the screening criteria and their application are contained in Appendix C.

Results of Screening

After applying the screening criteria to the alternative approaches considered, Parsons ES identified a recommended option for further analysis. Table 3 provides the results of the alternatives screening exercise. The **recommended option**, as a result of the screening effort, is option f, the stabilization and transfer of biocell material for use in re-construction of Lagoon #1. This option is preferred because it is:

- cost-effective (minimizing costs of transporting soil in comparison to options a, d and e, which involve off-site shipment of biocell material and hauling of an equivalent volume of clean fill from off-site to the CDF property);
- time-efficient (reducing risks of scheduling impacts potentially caused by others, as in options a, d and e);
- technically feasible (e.g., and readily implementable, in comparison with options b, c, d and e, for which ease of implementation is either uncertain or perceived to be more difficult);
- acceptable to the primary stakeholders (e.g., the risk takers, including regulatory agencies and CDF, in comparison with options a, d and e for which future control cannot be assured); and
- low risk with respect to permitting (in comparison with options a, c and d, which may require "permits" for off-site transportation of the biocell material).

A conceptual description, cost estimate and preliminary schedule for this option are provided in the following section. Please note that, for the sake of comparison only, costing and scheduling information were developed and are provided for the off-site landfill disposal option. The off-site landfill disposal option is being used as the "base case" in this comparison with the preferred option.

RECOMMENDED OPTION

Conceptual Design

The conceptual design for the preferred option includes implementation of the following steps. Figure 2 provides a profile view of the resulting conceptual design. To implement this design, we recommend that CDF plan to:

- remove any residual oily soil which remains in Lagoon #1 and transfer it to the biocell;
- re-grade Lagoon #1, as necessary, to assure that the side-walls are stable;
- place and compact a 12-inch layer of clay, in two 6-inch lifts, to provide an impermeable lining in the Lagoon #1 excavation;
- in the biocell, add and mix 2% lime and 10% fly ash with the oily soil to stabilize it;
- transfer the stabilized mixture from the biocell to Lagoon #1;
- place and compact the stabilized biocell material in Lagoon #1; and
- place and compact one additional 6-inch layer of clay to cap and seal the surface of Lagoon #1.

Depending on the final size of Lagoon #1, excess stabilized biocell material may be available. Drainage and traffic considerations must be taken into account for the possible locations for on-site placement and compaction of this material. Appropriate consideration of these factors will preclude future erosion of this material from the property.

Budgetary Cost Estimate

Parsons ES has developed, working in conjunction with Beaver Excavating Company, a budgetary cost estimate (i.e., within +/- 30%) of $150,000 for the recommended option. This estimate is based on the assumptions that:

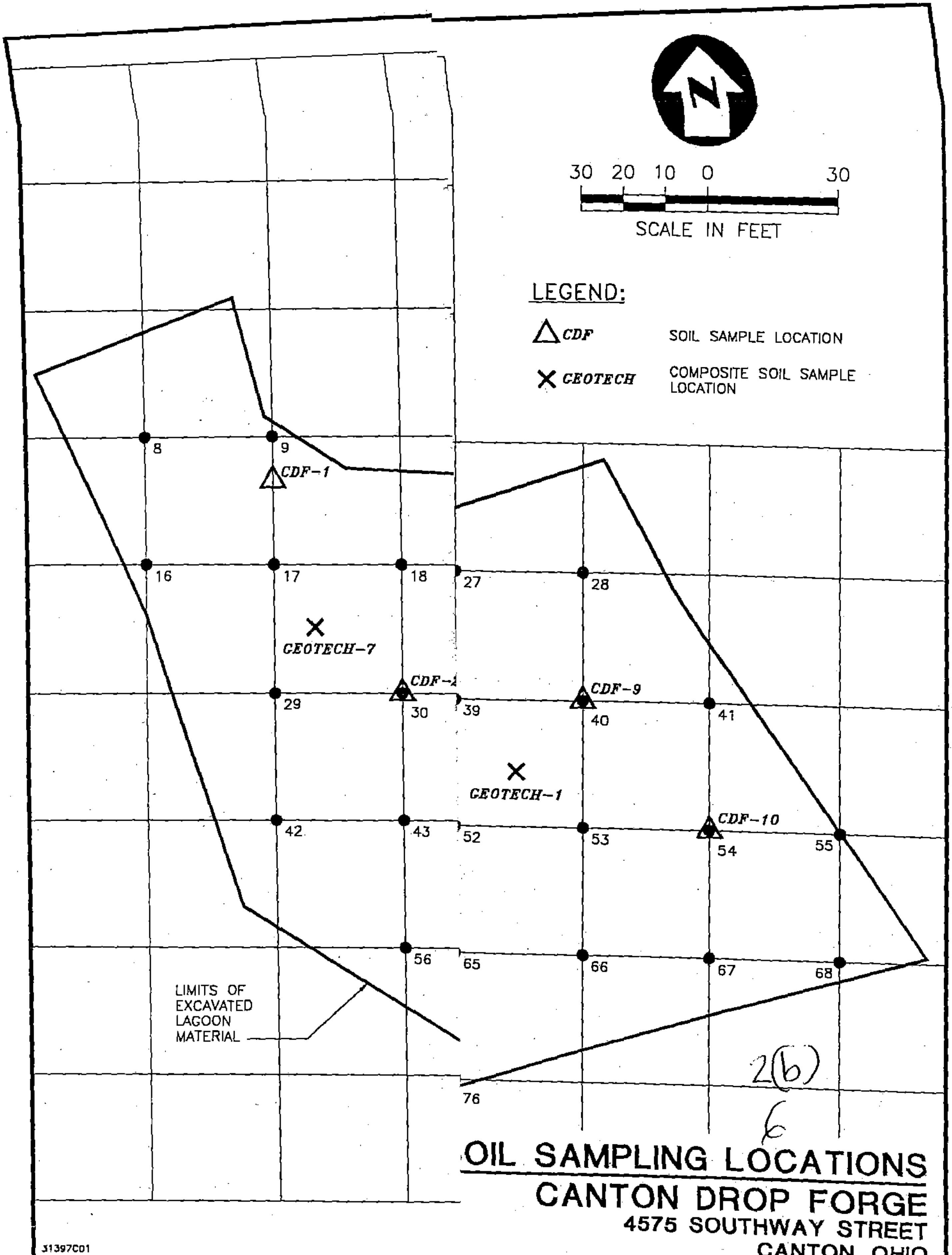
- about 3000 cubic yards of oily soil are available for stabilization in the biocell; and
- about 600 cubic yards of clay will be required for the upper and lower layers lining the re-constructed Lagoon #1.

Table 4 contains the cost estimate, provided by major cost category.

Preliminary Schedule

It is projected that this recommended option, for re-constructing Lagoon #1 and addressing the disposition of the biocell material concurrently, can be accomplished within 9 to 10 weeks after CDF's issuance of an order to proceed. In particular, the final design for Lagoon #1 can be completed within 3-4 weeks. The construction phase of the project is anticipated to require about six (6) weeks.

FIGURE 1

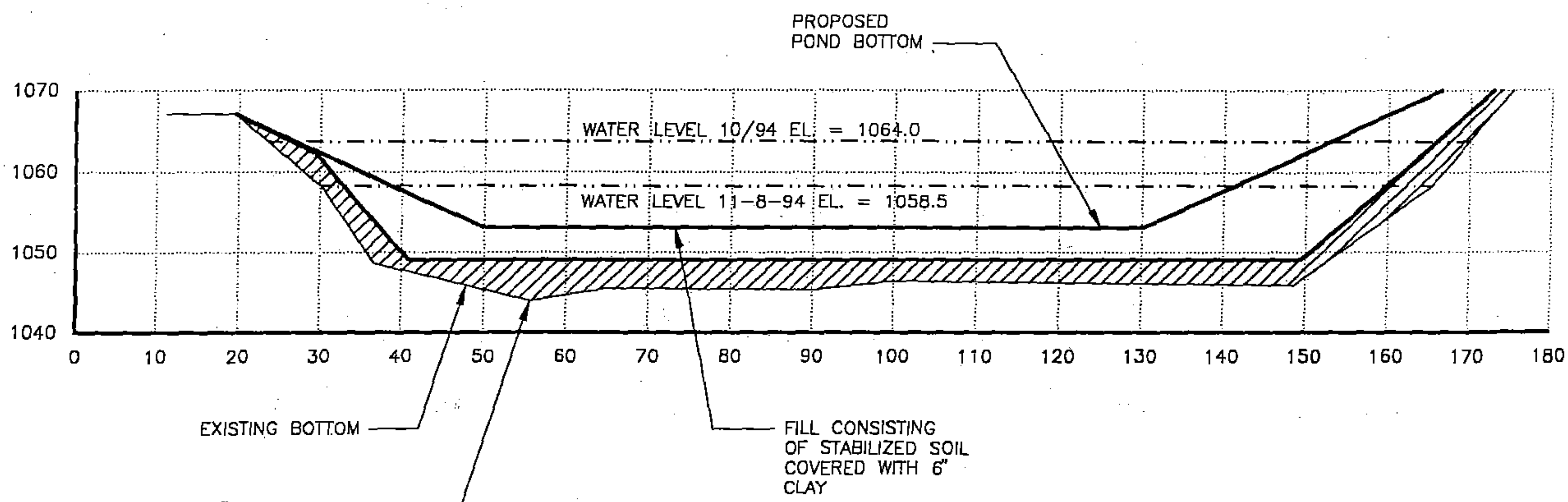


2(b)
6

OIL SAMPLING LOCATIONS
CANTON DROP FORGE
4575 SOUTHWAY STREET
CANTON, OHIO

731397

CDF006873



LAGOON CROSS SECTION

FIGURE 2

731397.01000

31397C02

PARSONS ENGINEERING SCIENCE, INC.

CDF006874

TABLE 1

ANALYTICAL PROCEDURES - SOIL
CANTON DROP FORGE
4575 SOUTHWAY STREET
CANTON, OHIO

18 April 1997

Analyte	Method
Total Petroleum Hydrocarbons - Middle Range Organics	EPA Method SW846-8015A (modified)
Total Petroleum Hydrocarbons - Heavy Range Organics	EPA Method SW846-8015A (modified)
Total Petroleum Hydrocarbons	EPA Method 418.1
Semi-Volatile Organic Compounds	EPA Method SW846-8270B

TABLE 2

RESULTS OF LABORATORY ANALYSIS - SOIL
CANTON DROP FORGE
4575 SOUTHWAY STREET
CANTON, OHIO

18 April 1997

Sample ID	Middle Range Organics (ppm)	Heavy Range Organics (ppm)	TPH-418.1 (ppm)	Pyrene (ppm)	Chrysene (ppm)
CDF-1	19.0	671	36,900	<20	<20
CDF-2	42.3	893	46,900	<20	<20
CDF-3	94.8	1,620	92,600	<20	<20
CDF-4	59.4	593	72,700	<20	<20
CDF-5	118	1,090	104,000	<20	<20
CDF-6	101	1,080	89,600	<20	<20
CDF-7	101	1,170	93,800	25.2	22.5
CDF-8	147	1,270	95,000	20.5	25.8
CDF-9	196	1,100	135,000	22.5	22.1
CDF-10	32.6	580	57,200	<20	<20
VAP Limits for Industrial Use Properties	20,000	40,000	NA	8,900	3,100

NA - Not applicable.

TABLE 3
CANTON DROP FORGE, INC. PLANT, CANTON, OHIO
LAGOON #1 RE-CONSTRUCTION / BIOCELL DISPOSITION OPTIONS

Indicator	Description of Options	Subjective Evaluation (1-5, with 5= best)					
		Economic Impact[1]	Scheduling Impact[2]	Technical Feasibility[3]	Stakeholder Acceptance[4]	Permitting Reqments[5]	Overall Rating
A	Disposal in off-site landfill[6]	3	5	4	3	3	18
B	Stabilization in on-site parking area[6] (to be covered with asphalt)	2	4	4	3	4	17
C	Stabilization in on-site track or roadway area[6] (not covered)	2	4	3	2	5	16
D	Transport to Ashland's Canton Refinery for feed-stock[6]	3	2	1	3	3	12
E	Transport to asphalt plant for feed-stock[6]	4	2	3	3	3	15
F	Stabilization and use in conjunction with clay layers[6]	4	4	4	4	5	21

Notes:

1) Economic Impact = 1 for options ≥ \$50/tn and = 5 for options ≤ \$10/tn.
2) Scheduling Impact = 1 for options ≥ 8 months and = 5 for options ≤ 2 months.
3) Technical Feasibility = 1 for impractical / very difficult options and = 5 for easily implemented options.
4) Stakeholder Acceptance = 1 for options meeting substantial / insurmountable objections and = 5 for fully acceptable options.
5) Permitting Requirements = 1 for substantial / difficult requirements and = 5 for no permits required.
6) Options A-E include transport, placement and compaction of clean fill in Lagoon #1

CDF006877

TABLE 4

BUDGETARY COST ESTIMATES (+/- 15%)
CANTON DROP FORGE, INC.
RECONSTRUCTION OF LAGOON #1 AND BIOCELL DISPOSITION

Task Description	Recommended Option Cost Estimate[1]	Off-Site Landfill Option Cost Estimate[2]
Conduct detailed design and construction review	$15,000	$7,000
Pump out Lagoon #1	$1,000	$1,000
Remove oily soil from Lagoon #1 (600 cy)	$12,000	$12,000
Re-grade Lagoon #1	$2,000	$2,000
Place and compact clay lining in Lagoon #1 (400 cy)	$14,000	$14,000
Stabilize oily soil material in the biocell (3,600 cy)	$36,000	--
Place and compact stabilized soil in Lagoon #1 (4,300 cy)	$43,000	--
Place and compact final clay layer (200 cy)	$7,000	$7,000
General conditions	$9,000	$5,000
Test, load, haul and dispose oily soil offsite (3,600 cy)	--	$117,000
Place and compact clean fill in Lagoon #1 (2,400 cy)	--	$ 24,000
Range	118,000/160,000	160,000/217,000
TOTAL	$139,000	$189,000
	±15% 21,000	

Note: 1 Assumes that stabilized biocell material and clay liners, when compacted and placed, will provide sufficient capacity in Lagoon #1 for intended stormwater impoundment. Must be verified through survey (i.e., as part of general conditions).

2 Assumes that biocell material can be disposed at American Landfill in Waynesburg without any pretreatment required (i.e., for stabilization, de-liquification, etc.).

CDF006878

APPENDIX A:

RESULTS OF ENVIRONMENTAL ANALYSES
FROM GEOANALYTICAL, INC.

FOR

CANTON DROP FORGE, INC.
CANTON, OHIO

APRIL/MAY 1997

G E O A n a l y t i c a l , I n c .

Report Issued To: Parsons Engineering Science
19101 Villaview Road, Suite 300
Cleveland, Ohio 44119

GEO Job# 9704102(A)
Matrix Type: Soil
Samples Received: 04/22/97
Date Analyzed: 04/25-26/97
Analysis Reported: 04/29/97

Project Number: 731397.01000
Project Name: Canton Drop Forge

NONHALOGENATED VOLATILE ORGANICS IN SOIL

Lab #	Date	Station Location	Middle Range Organics	Heavy Range Organics	Reporting Limit
1995	04/18/97	CDF-1	19.0	671	4.0
1996	04/18/97	CDF-2	42.3	893	4.0
1997	04/18/97	CDF-3	94.8	1,620	4.0
1998	04/18/97	CDF-4	59.4	593	4.0
1999	04/18/97	CDF-5	118	1,090	4.0
2000	04/18/97	CDF-6	101	1,080	4.0
2001	04/18/97	CDF-7	101	1,170	4.0
2002	04/18/97	CDF-8	147	1,270	4.0
2003	04/18/97	CDF-9	196	1,100	4.0
2004	04/18/97	CDF-10	32.6	580	4.0
			mg/Kg	mg/Kg	mg/Kg

Analytical Methodology Information

EPA Method SW846-8015A(Modified), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"

Middle Range Organics calculated from Heptane (C7) to Hexadecane (C16).

Heavy Range Organics calculated from Hexadecane (C16) to Dotriacontane (C32).

Samples may contain compounds with higher molecular weights than Dotriacontane (C32) which are not calculated in the Total Petroleum Hydrocarbons number reported.

These petroleum fractions are found in Rule 3746 of the OAC Section 3745-300-08 of the Generic Numeric Standards.

Initial Calibration Date: 05/20/96-01/09/97
Continuing Calibration Date: 04/25-26/97
Analyst: M. Darsot - C. Lang

CDF006880

ANALYSIS REVIEWED AND APPROVED BY Christie Thaxton

9263 Ravenna Rd. • Suite A-7 • Twinsburg, Ohio 44087 • Phone 216 963 6990 • Fax 216 963 6975

G E O A n a l y t i c a l, I n c.

Report Issued To: Parsons Engineering Science
19101 Villaview Road, Suite 300
Cleveland, Ohio 44119

GEO Job#: 9704102(B)
Matrix Type: Soil
Samples Received: 04/22/97
Date Analyzed: 04/25-28/97
Analysis Reported: 04/29/97

Project Number: 731397.01000
Project Name: Canton Drop Forge

PETROLEUM HYDROCARBONS, TOTAL RECOVERABLE IN SOIL

Lab #	Date	Station Location	Result	Reporting Limit
1995	04/18/97	CDF-1	36,900	2,000
1996	04/18/97	CDF-2	46,900	4,000
1997	04/18/97	CDF-3	92,600	4,000
1998	04/18/97	CDF-4	72,700	2,000
1999	04/18/97	CDF-5	104,000	4,000
2000	04/18/97	CDF-6	89,600	4,000
2001	04/18/97	CDF-7	93,800	4,000
2002	04/18/97	CDF-8	95,000	4,000
2003	04/18/97	CDF-9	135,000	2,000
2004	04/18/97	CDF-10	57,200	2,000
			mg/Kg	mg/Kg

Analytical Methodology Information

EPA Method 418.1, "Methods for Chemical Analysis of Water and Wastes"

Initial Calibration Date: 04/25-28/97
Continuing Calibration Date: 04/25-28/97
Analyst: J. Woodall

ANALYSIS REVIEWED AND APPROVED BY Christie Thaxton

CDF006881

G E O A n a l y t i c a l I n c.

Report Issued To: Parsons Engineering Science
19101 Villaview Road, Suite 300
Cleveland, Ohio 44119

GEO Job#	9704102(M)-2005	Project Number:	731397.01000
Matrix Type:	Water		
Samples Received:	04/22/97	Project Name:	Canton Drop Forge
Date Analyzed:	04/23/97		
Analysis Reported:	04/24/97		

Sample Date: 04/18/97
Sample Description: Trip Blank

GAS CHROMATOGRAPHY/MASS SPECTROMETRY FOR SEMI-VOLATILE ORGANICS IN WATER

COMPOUNDS	RESULTS	REPORTING LIMIT
N-Nitrosodimethylamine	< 25.0	25.0
Phenol	< 5.0	5.0
2-Chlorophenol	< 5.0	5.0
bis(2-Chloroethyl)ether	< 5.0	5.0
1,3-Dichlorobenzene	< 5.0	5.0
1,4-Dichlorobenzene	< 5.0	5.0
1,2-Dichlorobenzene	< 5.0	5.0
2-Methylphenol	< 5.0	5.0
bis(2-Chloroisopropyl)ether	< 5.0	5.0
4-Methylphenol	< 5.0	5.0
Hexachloroethane	< 5.0	5.0
N-Nitroso-di-n-propylamine	< 25.0	25.0
Nitrobenzene	< 5.0	5.0
Isophorone	< 5.0	5.0
2-Nitrophenol	< 5.0	5.0
2,4-Dimethylphenol	< 5.0	5.0
bis(2-Chloroethoxy)methane	< 5.0	5.0
2,4-Dichlorophenol	< 5.0	5.0
1,2,4-Trichlorobenzene	< 5.0	5.0
Naphthalene	< 5.0	5.0
4-Chloroanaline	< 5.0	5.0
Hexachlorobutadiene	< 5.0	5.0
4-Chloro-3-methylphenol	< 5.0	5.0
2-Methylnaphthalene	< 5.0	5.0
Hexachlorocyclopentadiene	< 5.0	5.0
2,4,5-Trichlorophenol	< 5.0	5.0
2,4,6-Trichlorophenol	< 5.0	5.0
2-Chloronaphthalene	< 5.0	5.0
2-Nitroanaline	< 5.0	5.0
Acenaphthylene	< 5.0	5.0
Dimethyl phthalate	< 5.0	5.0
2,6-Dinitrotoluene	< 5.0	5.0
3-Nitroanaline	< 5.0	5.0
Acenaphthene	< 5.0	5.0
2,4-Dinitrophenol	< 25.0	25.0
4-Nitrophenol	< 5.0	5.0
Dibenzofuran	< 5.0	5.0
2,4-Dinitrotoluene	< 5.0	5.0
	ug/L	ug/L

CDF006882

8263 Ravenna Rd. • Suite A-7 • Twinsburg, Ohio 44087 • Phone 216 963 6990 • Fax 216 963 6975

G . E O A n a l y t i c a l , I n c .

GEO Job# :9704102(M)-2005
Page 2 of 2

COMPOUNDS	RESULTS	REPORTING LIMIT
Diethyl phthalate	< 5.0	5.0
Fluorene	< 5.0	5.0
4-Chlorophenylphenyl ether	< 5.0	5.0
4-Nitroanaline	< 5.0	5.0
2-Methyl-4,6-dinitrophenol	< 25.0	25.0
N-Nitrosodiphenylamine	< 5.0	5.0
4-Bromphenylphenyl ether	< 5.0	5.0
Hexachlorobenzene.	< 5.0	5.0
Pentachlorophenol	< 5.0	5.0
Phenanthrene	< 5.0	5.0
Anthracene	< 5.0	5.0
Carbazole	< 5.0	5.0
Di-n-butyl phthalate	< 5.0	5.0
Fluoranthene	< 5.0	5.0
Pyrene	< 5.0	5.0
Butyl benzyl phthalate	< 5.0	5.0
Benzo(a)anthracene	< 5.0	5.0
3,3'-Dichlorobenzidine	< 25.0	25.0
Chrysene	< 5.0	5.0
bis(2-Ethylhexyl) phthalate	< 5.0	5.0
Di-n-octyl phthalate	< 5.0	5.0
Benzo(b)fluoranthene	< 5.0	5.0
Benzo(k)fluoranthene	< 5.0	5.0
Benzo(a)pyrene	< 2.0	2.0
Indeno(1,2,3-cd)pyrene	< 5.0	5.0
Dibenzo(a,h)anthracene	< 5.0	5.0
Benzo(ghi)perylene	< 5.0	5.0
	ug/L	ug/L

COMPOUND	% SURROGATE RECOVERY	ACCEPTABLE RANGE
2-Fluorophenol	50	35-110
Phenol d5	27	10 -110
Nitrobenzene d5	68	35 -114
2-Fluorobiphenyl	72	43 -116
2,4,6-Tribromophenol	89	10 -123
Terphenyl d14	72	33 -141

* indicates surrogate recovery outside of acceptable range.

Analytical Methodology Information

EPA Method SW846-8270B, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"

Initial Calibration Date: 04/17/97
Continuing Calibration Date: 04/23/97
Analyst: T. Lang

ANALYSIS REVIEWED AND APPROVED BY Christy Thaxton

CDF006883

GEO Analytical, Inc.

Report Issued To: Parsons Engineering Science
19101 Villaview Road, Suite 300
Cleveland, Ohio 44119

GEO Job#	9704102(C)-1995	Project Number:	731397.01000
Matrix Type:	Soil		
Samples Received:	04/22/97	Project Name:	Canton Drop Forge
Date Analyzed:	04/30-05/02/97		
Analysis Reported:	05/06/97		

Sample Date: 04/18/97
Sample Description: CDF-1

GAS CHROMATOGRAPHY/MASS SPECTROMETRY FOR SEMI-VOLATILE ORGANICS IN SOIL

COMPOUNDS	RESULTS	REPORTING LIMIT
N-Nitrosodimethylamine	< 100	100
Phenol	< 20.0	20.0
2-Chlorophenol	< 20.0	20.0
bis(2-Chloroethyl)ether	< 20.0	20.0
1,3-Dichlorobenzene	< 20.0	20.0
1,4-Dichlorobenzene	< 20.0	20.0
1,2-Dichlorobenzene	< 20.0	20.0
2-Methylphenol	< 20.0	20.0
bis(2-Chloroisopropyl)ether	< 20.0	20.0
4-Methylphenol	< 20.0	20.0
Hexachloroethane	< 20.0	20.0
N-Nitroso-di-n-propylamine	< 100	100
Nitrobenzene	< 20.0	20.0
Isophorone	< 20.0	20.0
2-Nitrophenol	< 20.0	20.0
2,4-Dimethylphenol	< 20.0	20.0
bis(2-Chloroethoxy)methane	< 20.0	20.0
2,4-Dichlorophenol	< 20.0	20.0
1,2,4-Trichlorobenzene	< 20.0	20.0
Naphthalene	< 20.0	20.0
4-Chloroanaline	< 20.0	20.0
Hexachlorobutadiene	< 20.0	20.0
4-Chloro-3-methylphenol	< 20.0	20.0
2-Methylnaphthalene	< 20.0	20.0
Hexachlorocyclopentadiene	< 20.0	20.0
2,4,5-Trichlorophenol	< 20.0	20.0
2,4,6-Trichlorophenol	< 20.0	20.0
2-Chloronaphthalene	< 20.0	20.0
2-Nitroanaline	< 20.0	20.0
Acenaphthylene	< 20.0	20.0
Dimethyl phthalate	< 20.0	20.0
2,6-Dinitrotoluene	< 20.0	20.0
3-Nitroanaline	< 20.0	20.0
Acenaphthene	< 20.0	20.0
2,4-Dinitrophenol	< 100	100
4-Nitrophenol	< 20.0	20.0
Dibenzofuran	< 20.0	20.0
2,4-Dinitrotoluene	< 20.0	20.0
	mg/Kg	mg/Kg

CDF006884

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GEO Analytical, Inc.

GEO Job# 9704102(C)-1995
Page 2 of 2

COMPOUNDS	RESULTS	REPORTING LIMIT
Diethyl phthalate	< 20.0	20.0
Fluorene	< 20.0	20.0
4-Chlorophenylphenyl ether	< 20.0	20.0
4-Nitroanaline	< 20.0	20.0
2-Methyl-4,6-dinitrophenol	< 100	100
N-Nitrosodiphenylamine	< 20.0	20.0
4-Bromphenylphenyl ether	< 20.0	20.0
Hexachlorobenzene	< 20.0	20.0
Pentachlorophenol	< 20.0	20.0
Phenanthrene	< 20.0	20.0
Anthracene	< 20.0	20.0
Carbazole	< 20.0	20.0
Di-n-butyl phthalate	< 20.0	20.0
Fluoranthene	< 20.0	20.0
Pyrene	< 20.0	20.0
Butyl benzyl phthalate	< 20.0	20.0
Benzo(a)anthracene	< 20.0	20.0
3,3'-Dichlorobenzidine	< 100	100
Chrysene	< 20.0	20.0
bis(2-Ethylhexyl) phthalate	< 20.0	20.0
Di-n-octyl phthalate	< 20.0	20.0
Benzo(b)fluoranthene	< 20.0	20.0
Benzo(k)fluoranthene	< 20.0	20.0
Benzo(a)pyrene	< 20.0	20.0
Indeno(1,2,3-cd)pyrene	< 20.0	20.0
Dibenzo(a,h)anthracene	< 20.0	20.0
Benzo(ghi)perylene	< 20.0	20.0
	mg/Kg	mg/Kg

COMPOUND	% SURROGATE RECOVERY	ACCEPTABLE RANGE
2-Fluorophenol	91	33 - 144
Phenol d5	76	62 - 120
Nitrobenzene d5	100	80 - 132
2-Fluorobiphenyl	99	67 - 105
2,4,6-Tribromophenol	92	24 - 135
Terphenyl d14	82	49 - 141

* Indicates surrogate recovery outside of acceptable range.

Analytical Methodology Information

EPA Method SW846-8270B, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"

Initial Calibration Date: 04/17/97-05/01/97
Continuing Calibration Date: 04/30-05/02/97
Analyst: T. Lang

REVIEWED AND APPROVED BY Christie Thaxton

CDF006885

G E O . A n a l y t i c a l . I n c .

Report Issued To: Parsons Engineering Science
19101 Villaview Road, Suite 300
Cleveland, Ohio 44119

GEO Job#	9704102(D)-1996	Project Number:	731397.01000
Matrix Type:	Soil		
Samples Received:	04/22/97	Project Name:	Canton Drop Forge
Date Analyzed:	04/30-05/02/97		
Analysis Reported:	05/06/97		

Sample Date: 04/18/97
Sample Description: CDF-2

GAS CHROMATOGRAPHY/MASS SPECTROMETRY FOR SEMI-VOLATILE ORGANICS IN SOIL

COMPOUNDS	RESULTS	REPORTING LIMIT
N-Nitrosodimethylamine	< 100	100
Phenol	< 20.0	20.0
2-Chlorophenol	< 20.0	20.0
bis(2-Chloroethyl)ether	< 20.0	20.0
1,3-Dichlorobenzene	< 20.0	20.0
1,4-Dichlorobenzene	< 20.0	20.0
1,2-Dichlorobenzene	< 20.0	20.0
2-Methylphenol	< 20.0	20.0
bis(2-Chloroisopropyl)ether	< 20.0	20.0
4-Methylphenol	< 20.0	20.0
Hexachloroethane	< 20.0	20.0
N-Nitroso-di-n-propylamine	< 100	100
Nitrobenzene	< 20.0	20.0
Isophorone	< 20.0	20.0
2-Nitrophenol	< 20.0	20.0
2,4-Dimethylphenol	< 20.0	20.0
bis(2-Chloroethoxy)methane	< 20.0	20.0
2,4-Dichlorophenol	< 20.0	20.0
1,2,4-Trichlorobenzene	< 20.0	20.0
Naphthalene	< 20.0	20.0
4-Chloroanaline	< 20.0	20.0
Hexachlorobutadiene	< 20.0	20.0
4-Chloro-3-methylphenol	< 20.0	20.0
2-Methylnaphthalene	< 20.0	20.0
Hexachlorocyclopentadiene	< 20.0	20.0
2,4,5-Trichlorophenol	< 20.0	20.0
2,4,6-Trichlorophenol	< 20.0	20.0
2-Chloronaphthalene	< 20.0	20.0
2-Nitroanaline	< 20.0	20.0
Acenaphthylene	< 20.0	20.0
Dimethyl phthalate	< 20.0	20.0
2,6-Dinitrotoluene	< 20.0	20.0
3-Nitroanaline	< 20.0	20.0
Acenaphthene	< 20.0	20.0
2,4-Dinitrophenol	< 100	100
4-Nitrophenol	< 20.0	20.0
Dibenzofuran	< 20.0	20.0
2,4-Dinitrotoluene	< 20.0	20.0
	mg/Kg	mg/Kg

CDF006886

G E O . A n a l y t i c a l , I n c .

GEO Job# 9704102(D)-1996

COMPOUNDS	RESULTS	REPORTING LIMIT
Diethyl phthalate	< 20.0	20.0
Fluorene	< 20.0	20.0
4-Chlorophenylphenyl ether	< 20.0	20.0
4-Nitroanaline	< 20.0	20.0
2-Methyl-4,6-dinitrophenol	< 100	100
N-Nitrosodiphenylamine	< 20.0	20.0
4-Bromphenylphenyl ether	< 20.0	20.0
Hexachlorobenzene	< 20.0	20.0
Pentachlorophenol	< 20.0	20.0
Phenanthrene	< 20.0	20.0
Anthracene	< 20.0	20.0
Carbazole	< 20.0	20.0
Di-n-butyl phthalate	< 20.0	20.0
Fluoranthene	< 20.0	20.0
Pyrene	< 20.0	20.0
Butyl benzyl phthalate	< 20.0	20.0
Benzo(a)anthracene	< 20.0	20.0
3,3'-Dichlorobenzidine	< 100	100
Chrysene	< 20.0	20.0
bis(2-Ethylhexyl) phthalate	< 20.0	20.0
Di-n-octyl phthalate	< 20.0	20.0
Benzo(b)fluoranthene	< 20.0	20.0
Benzo(k)fluoranthene	< 20.0	20.0
Benzo(a)pyrene	< 20.0	20.0
Indeno(1,2,3-cd)pyrene	< 20.0	20.0
Dibenzo(a,h)anthracene	< 20.0	20.0
Benzo(ghi)perylene	< 20.0	20.0
	mg/Kg	mg/Kg

COMPOUND	% SURROGATE RECOVERY	ACCEPTABLE RANGE
2-Fluorophenol	92	33 - 144
Phenol d5	82	62 - 120
Nitrobenzene d5	102	60 - 132
2-Fluorobiphenyl	69	67 - 105
2,4,6-Tribromophenol	95	24 - 135
Terphenyl d14	94	49 - 141

* Indicates surrogate recovery outside of acceptable range.

Analytical Methodology Information

EPA Method SW846-8270B, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"

Initial Calibration Date: 04/17/97-05/01/97
Continuing Calibration Date: 04/30-05/02/97
Analyst: T. Lang

REVIEWED AND APPROVED BY Christu Thomas

CDF006887

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G E O A n a l y t i c a l , I n c.

GEO Job# 9704102(E)-1997

COMPOUNDS	RESULTS	REPORTING LIMIT
Diethyl phthalate	< 20.0	20.0
Fluorene	< 20.0	20.0
4-Chlorophenylphenyl ether	< 20.0	20.0
4-Nitroanaline	< 20.0	20.0
2-Methyl-4,6-dinitrophenol	< 100	100
N-Nitrosodiphenylamine	< 20.0	20.0
4-Bromphenylphenyl ether	< 20.0	20.0
Hexachlorobenzene	< 20.0	20.0
Pentachlorophenol	< 20.0	20.0
Phenanthrene	< 20.0	20.0
Anthracene	< 20.0	20.0
Carbazole	< 20.0	20.0
Di-n-butyl phthalate	< 20.0	20.0
Fluoranthene	< 20.0	20.0
Pyrene	< 20.0	20.0
Butyl benzyl phthalate	< 20.0	20.0
Benzo(a)anthracene	< 20.0	20.0
3,3'-Dichlorobenzidine	< 100	100
Chrysene	< 20.0	20.0
bis(2-Ethylhexyl) phthalate	< 20.0	20.0
Di-n-octyl phthalate	< 20.0	20.0
Benzo(b)fluoranthene	< 20.0	20.0
Benzo(k)fluoranthene	< 20.0	20.0
Benzo(a)pyrene	< 20.0	20.0
Indeno(1,2,3-cd)pyrene	< 20.0	20.0
Dibenzo(a,h)anthracene	< 20.0	20.0
Benzo(ghi)perylene	< 20.0	20.0
	mg/Kg	mg/Kg

COMPOUND	% SURROGATE RECOVERY	ACCEPTABLE RANGE
2-Fluorophenol	88	33 - 144
Phenol d5	78	62 - 120
Nitrobenzene d5	93	80 - 132
2-Fluorobiphenyl	74	67 - 105
2,4,6-Tribromophenol	101	24 - 135
Terphenyl d14	80	49 - 141

* Indicates surrogate recovery outside of acceptable range.

Analytical Methodology Information

EPA Method SW846-8270B, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"

Initial Calibration Date: 04/17/97-05/01/97
Continuing Calibration Date: 04/30-05/02/97
Analyst: T. Lang

REVIEWED AND APPROVED BY Christa Thaxton

CDF006888

G E O A n a l y t i c a l, I n c.

Report Issued To: Parsons Engineering Science
19101 Villaview Road, Suite 300
Cleveland, Ohio 44119

GEO Job#	9704102(F)-1998	Project Number:	731397.01000
Matrix Type:	Soil		
Samples Received:	04/22/97	Project Name:	Canton Drop Forge
Date Analyzed:	04/30-05/02/97		
Analysis Reported:	05/06/97		

Sample Date: 04/18/97
Sample Description: CDF-4

GAS CHROMATOGRAPHY/MASS SPECTROMETRY FOR SEMI-VOLATILE ORGANICS IN SOIL

COMPOUNDS	RESULTS	REPORTING LIMIT
N-Nitrosodimethylamine	< 100	100
Phenol	< 20.0	20.0
2-Chlorophenol	< 20.0	20.0
bis(2-Chloroethyl)ether	< 20.0	20.0
1,3-Dichlorobenzene	< 20.0	20.0
1,4-Dichlorobenzene	< 20.0	20.0
1,2-Dichlorobenzene	< 20.0	20.0
2-Methylphenol	< 20.0	20.0
bis(2-Chloroisopropyl)ether	< 20.0	20.0
4-Methylphenol	< 20.0	20.0
Hexachloroethane	< 20.0	20.0
N-Nitroso-di-n-propylamine	< 100	100
Nitrobenzene	< 20.0	20.0
Isophorone	< 20.0	20.0
2-Nitrophenol	< 20.0	20.0
2,4-Dimethylphenol	< 20.0	20.0
bis(2-Chloroethoxy)methane	< 20.0	20.0
2,4-Dichlorophenol	< 20.0	20.0
1,2,4-Trichlorobenzene	< 20.0	20.0
Naphthalene	< 20.0	20.0
4-Chloroanaline	< 20.0	20.0
Hexachlorobutadiene	< 20.0	20.0
4-Chloro-3-methylphenol	< 20.0	20.0
2-Methylnaphthalene	< 20.0	20.0
Hexachlorocyclopentadiene	< 20.0	20.0
2,4,5-Trichlorophenol	< 20.0	20.0
2,4,6-Trichlorophenol	< 20.0	20.0
2-Chloronaphthalene	< 20.0	20.0
2-Nitroanaline	< 20.0	20.0
Acenaphthylene	< 20.0	20.0
Dimethyl phthalate	< 20.0	20.0
2,6-Dinitrotoluene	< 20.0	20.0
3-Nitroanaline	< 20.0	20.0
Acenaphthene	< 20.0	20.0
2,4-Dinitrophenol	< 100	100
4-Nitrophenol	< 20.0	20.0
Dibenzofuran	< 20.0	20.0
2,4-Dinitrotoluene	< 20.0	20.0

mg/Kg

CDF006889

G E O A n a l y t i c a l, I n c.

GEO Job# 9704102(F)-1998
Page 2 of 2

COMPOUNDS	RESULTS	REPORTING LIMIT
Diethyl phthalate	< 20.0	20.0
Fluorene	< 20.0	20.0
4-Chlorophenylphenyl ether	< 20.0	20.0
4-Nitroenaline	< 20.0	20.0
2-Methyl-4,6-dinitrophenol	< 100	100
N-Nitrosodiphenylamine	< 20.0	20.0
4-Bromphenylphenyl ether	< 20.0	20.0
Hexachlorobenzene	< 20.0	20.0
Pentachlorophenol	< 20.0	20.0
Phenanthrene	< 20.0	20.0
Anthracene	< 20.0	20.0
Carbazole	< 20.0	20.0
Di-n-butyl phthalate	< 20.0	20.0
Fluoranthene	< 20.0	20.0
Pyrene	< 20.0	20.0
Butyl benzyl phthalate	< 20.0	20.0
Benzo(a)anthracene	< 20.0	20.0
3,3'-Dichlorobenzidine	< 100	100
Chrysene	< 20.0	20.0
bis(2-Ethylhexyl) phthalate	< 20.0	20.0
Di-n-octyl phthalate	< 20.0	20.0
Benzo(b)fluoranthene	< 20.0	20.0
Benzo(k)fluoranthene	< 20.0	20.0
Benzo(a)pyrene	< 20.0	20.0
Indeno(1,2,3-cd)pyrene	< 20.0	20.0
Dibenzo(a,h)anthracene	< 20.0	20.0
Benzo(ghi)perylene	< 20.0	20.0
	mg/Kg	mg/Kg

COMPOUND	% SURROGATE RECOVERY	ACCEPTABLE RANGE
2-Fluorophenol	82	33 - 144
Phenol d5	72	62 - 120
Nitrobenzene d5	86	60 - 132
2-Fluorobiphenyl	95	67 - 105
2,4,6-Tribromophenol	92	24 - 135
Terphenyl d14	79	49 - 141

* Indicates surrogate recovery outside of acceptable range.

Analytical Methodology Information

EPA Method SW846-8270B, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"

Initial Calibration Date: 04/17/97-05/01/97
Continuing Calibration Date: 04/30-05/02/97
Analyst: T. Lang

REVIEWED AND APPROVED BY Christie Thornton

CDF006890

9263 Ravenna Rd. • Suite A-7 • Twinsburg, Ohio 44087 • Phone 216 963 6990 • Fax 216 963 6975

G E O . A n a l y t i c a l , I n c .

Report Issued To:	Parsons Engineering Science 19101 Villaview Road, Suite 300 Cleveland, Ohio 44119

GEO Job#:	9704102(G)-1999	Project Number:	731397.01000
Matrix Type:	Soil		
Samples Received:	04/22/97	Project Name:	Canton Drop Forge
Date Analyzed:	04/30-05/03/97		
Analysis Reported:	05/06/97		

Sample Date: 04/18/97
Sample Description: CDF-5

GAS CHROMATOGRAPHY/MASS SPECTROMETRY FOR SEMI-VOLATILE ORGANICS IN SOIL

COMPOUNDS	RESULTS	REPORTING LIMIT
N-Nitrosodimethylamine	< 100	100
Phenol	< 20.0	20.0
2-Chlorophenol	< 20.0	20.0
bis(2-Chloroethyl)ether	< 20.0	20.0
1,3-Dichlorobenzene	< 20.0	20.0
1,4-Dichlorobenzene	< 20.0	20.0
1,2-Dichlorobenzene	< 20.0	20.0
2-Methylphenol	< 20.0	20.0
bis(2-Chloroisopropyl)ether	< 20.0	20.0
4-Methylphenol	< 20.0	20.0
Hexachloroethane	< 20.0	20.0
N-Nitroso-di-n-propylamine	< 100	100
Nitrobenzene	< 20.0	20.0
Isophorone	< 20.0	20.0
2-Nitrophenol	< 20.0	20.0
2,4-Dimethylphenol	< 20.0	20.0
bis(2-Chloroethoxy)methane	< 20.0	20.0
2,4-Dichlorophenol	< 20.0	20.0
1,2,4-Trichlorobenzene	< 20.0	20.0
Naphthalene	< 20.0	20.0
4-Chloroanaline	< 20.0	20.0
Hexachlorobutadiene	< 20.0	20.0
4-Chloro-3-methylphenol	< 20.0	20.0
2-Methylnaphthalene	< 20.0	20.0
Hexachlorocyclopentadiene	< 20.0	20.0
2,4,5-Trichlorophenol	< 20.0	20.0
2,4,6-Trichlorophenol	< 20.0	20.0
2-Chloronaphthalene	< 20.0	20.0
2-Nitroanaline	< 20.0	20.0
Acenaphthylene	< 20.0	20.0
Dimethyl phthalate	< 20.0	20.0
2,6-Dinitrotoluene	< 20.0	20.0
3-Nitroanaline	< 20.0	20.0
Acenaphthene	< 20.0	20.0
2,4-Dinitrophenol	< 100	100
4-Nitrophenol	< 20.0	20.0
Dibenzofuran	< 20.0	20.0
2,4-Dinitrotoluene	< 20.0	20.0
	mg/Kg	mg/Kg

CDF006891

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G E O Analytical, Inc.

GEO Job# . 9704102(G)-1999
Page 2 of 2

COMPOUNDS	RESULTS	REPORTING LIMIT
Diethyl phthalate	< 20.0	20.0
Fluorene	< 20.0	20.0
4-Chlorophenylphenyl ether	< 20.0	20.0
4-Nitroanaline	< 20.0	20.0
2-Methyl-4,6-dinitrophenol	< 100	100
N-Nitrosodiphenylamine	< 20.0	20.0
4-Bromphenylphenyl ether	< 20.0	20.0
Hexachlorobenzene	< 20.0	20.0
Pentachlorophenol	< 20.0	20.0
Phenanthrene	< 20.0	20.0
Anthracene	< 20.0	20.0
Carbazole	< 20.0	20.0
Di-n-butyl phthalate	< 20.0	20.0
Fluoranthene	< 20.0	20.0
Pyrene	< 20.0	20.0
Butyl benzyl phthalate	< 20.0	20.0
Benzo(a)anthracene	< 20.0	20.0
3,3'-Dichlorobenzidine	< 100	100
Chrysene	< 20.0	20.0
bis(2-Ethylhexyl) phthalate	< 20.0	20.0
Di-n-octyl phthalate	< 20.0	20.0
Benzo(b)fluoranthene	< 20.0	20.0
Benzo(k)fluoranthene	< 20.0	20.0
Benzo(a)pyrene	< 20.0	20.0
Indeno(1,2,3-cd)pyrene	< 20.0	20.0
Dibenzo(a,h)anthracene	< 20.0	20.0
Benzo(ghi)perylene	< 20.0	20.0
	mg/Kg	mg/Kg

COMPOUND	% SURROGATE RECOVERY	ACCEPTABLE RANGE
2-Fluorophenol	80	33 - 144
Phenol d5	71	62 - 120
Nitrobenzene d5	91	60 - 132
2-Fluorobiphenyl	101	67 - 105
2,4,6-Tribromophenol	94	24 - 135
Terphenyl d14	84	49 - 141

* Indicates surrogate recovery outside of acceptable range.

Analytical Methodology Information

EPA Method SW846-8270B, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"

Initial Calibration Date: 04/17/97-05/01/97
Continuing Calibration Date: 04/30-05/03/97
Analyst: T. Lang

REVIEWED AND APPROVED BY: Christine Thomas

CDF006892

G E O A n a l y t i c a l I n c .

Report Issued To: Parsons Engineering Science
19101 Villaview Road, Suite 300
Cleveland, Ohio 44119

GEO Job#: 9704102(H)-2000
Matrix Type: Soil
Samples Received: 04/22/97
Date Analyzed: 04/30-05/03/97
Analysis Reported: 05/06/97

Project Number: 731397,01000
Project Name: Canton Drop Forge

Sample Date: 04/18/97
Sample Description: CDF-6

GAS CHROMATOGRAPHY/MASS SPECTROMETRY FOR SEMI-VOLATILE ORGANICS IN SOIL

COMPOUNDS	RESULTS	REPORTING LIMIT
N-Nitrosodimethylamine	< 100	100
Phenol	< 20.0	20.0
2-Chlorophenol	< 20.0	20.0
bis(2-Chloroethyl)ether	< 20.0	20.0
1,3-Dichlorobenzene	< 20.0	20.0
1,4-Dichlorobenzene	< 20.0	20.0
1,2-Dichlorobenzene	< 20.0	20.0
2-Methylphenol	< 20.0	20.0
bis(2-Chloroisopropyl)ether	< 20.0	20.0
4-Methylphenol	< 20.0	20.0
Hexachloroethane	< 20.0	20.0
N-Nitroso-di-n-propylamine	< 100	100
Nitrobenzene	< 20.0	20.0
Isophorone	< 20.0	20.0
2-Nitrophenol	< 20.0	20.0
2,4-Dimethylphenol	< 20.0	20.0
bis(2-Chloroethoxy)methane	< 20.0	20.0
2,4-Dichlorophenol	< 20.0	20.0
1,2,4-Trichlorobenzene	< 20.0	20.0
Naphthalene	< 20.0	20.0
4-Chloroanaline	< 20.0	20.0
Hexachlorobutadiene	< 20.0	20.0
4-Chloro-3-methylphenol	< 20.0	20.0
2-Methylnaphthalene	< 20.0	20.0
Hexachlorocyclopentadiene	< 20.0	20.0
2,4,5-Trichlorophenol	< 20.0	20.0
2,4,6-Trichlorophenol	< 20.0	20.0
2-Chloronaphthalene	< 20.0	20.0
2-Nitroanaline	< 20.0	20.0
Acenaphthylene	< 20.0	20.0
Dimethyl phthalate	< 20.0	20.0
2,6-Dinitrotoluene	< 20.0	20.0
3-Nitroanaline	< 20.0	20.0
Acenaphthene	< 20.0	20.0
2,4-Dinitrophenol	< 100	100
4-Nitrophenol	< 20.0	20.0
Dibenzofuran	< 20.0	20.0
2,4-Dinitrotoluene	< 20.0	20.0
	mg/Kg	mg/Kg

CDF006893

G E O A n a l y t i c a l , I n c .

GEO Job# 9704102(H)-2000

COMPOUNDS	RESULTS	REPORTING LIMIT
Diethyl phthalate	< 20.0	20.0
Fluorene	< 20.0	20.0
4-Chlorophenylphenyl ether	< 20.0	20.0
4-Nitroanaline	< 20.0	20.0
2-Methyl-4,6-dinitrophenol	< 100	100
N-Nitrosodiphenylamine	< 20.0	20.0
4-Bromphenylphenyl ether	< 20.0	20.0
Hexachlorobenzene	< 20.0	20.0
Pentachlorophenol	< 20.0	20.0
Phenanthrene	< 20.0	20.0
Anthracene	< 20.0	20.0
Carbazole	< 20.0	20.0
Di-n-butyl phthalate	< 20.0	20.0
Fluoranthene	< 20.0	20.0
Pyrene	< 20.0	20.0
Butyl benzyl phthalate	< 20.0	20.0
Benzo(a)anthracene	< 20.0	20.0
3,3'-Dichlorobenzidine	< 100	100
Chrysene	< 20.0	20.0
bis(2-Ethylhexyl) phthalate	< 20.0	20.0
Di-n-octyl phthalate	< 20.0	20.0
Benzo(b)fluoranthene	< 20.0	20.0
Benzo(k)fluoranthene	< 20.0	20.0
Benzo(a)pyrene	< 20.0	20.0
Indeno(1,2,3-cd)pyrene	< 20.0	20.0
Dibenzo(a,h)anthracene	< 20.0	20.0
Benzo(ghi)perylene	< 20.0	20.0
	mg/Kg	mg/Kg

COMPOUND	% SURROGATE RECOVERY	ACCEPTABLE RANGE
2-Fluorophenol	86	33 - 144
Phenol d5	75	62 - 120
Nitrobenzene d5	84	80 - 132
2-Fluorobiphenyl	98	67 - 105
2,4,6-Tribromophenol	88	24 - 135
Terphenyl d14	89	49 - 141

* Indicates surrogate recovery outside of acceptable range.

Analytical Methodology Information

EPA Method SW846-8270B, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"

Initial Calibration Date: 04/17/97-05/01/97
Continuing Calibration Date: 04/30-05/03/97
Analyst: T. Lang.

REVIEWED AND APPROVED BY Christa Traxim

CDF006894

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G E O . A n a l y t i c a l , I n c .

Report Issued To: Parsons Engineering Science
19101 Villaview Road, Suite 300
Cleveland, Ohio 44119

GEO Job#: 9704102(I)-2001
Matrix Type: Soil
Samples Received: 04/22/97
Date Analyzed: 04/30-05/05/97
Analysis Reported: 05/06/97

Project Number: 731397.01000

Project Name: Canton Drop Forge

Sample Date: 04/18/97
Sample Description: CDF-7

GAS CHROMATOGRAPHY/MASS SPECTROMETRY FOR SEMI-VOLATILE ORGANICS IN SOIL

COMPOUNDS	RESULTS	REPORTING LIMIT
N-Nitrosodimethylamine	< 100	100
Phenol	< 20.0	20.0
2-Chlorophenol	< 20.0	20.0
bis(2-Chloroethyl)ether	< 20.0	20.0
1,3-Dichlorobenzene	< 20.0	20.0
1,4-Dichlorobenzene	< 20.0	20.0
1,2-Dichlorobenzene	< 20.0	20.0
2-Methylphenol	< 20.0	20.0
bis(2-Chloroisopropyl)ether	< 20.0	20.0
4-Methylphenol	< 20.0	20.0
Hexachloroethane	< 20.0	20.0
N-Nitroso-di-n-propylamine	< 100	100
Nitrobenzene	< 20.0	20.0
Isophorone	< 20.0	20.0
2-Nitrophenol	< 20.0	20.0
2,4-Dimethylphenol	< 20.0	20.0
bis(2-Chloroethoxy)methane	< 20.0	20.0
2,4-Dichlorophenol	< 20.0	20.0
1,2,4-Trichlorobenzene	< 20.0	20.0
Naphthalene	< 20.0	20.0
4-Chloroanaline	< 20.0	20.0
Hexachlorobutadiene	< 20.0	20.0
4-Chloro-3-methylphenol	< 20.0	20.0
2-Methylnaphthalene	< 20.0	20.0
Hexachlorocyclopentadiene	< 20.0	20.0
2,4,5-Trichlorophenol	< 20.0	20.0
2,4,6-Trichlorophenol	< 20.0	20.0
2-Chloronaphthalene	< 20.0	20.0
2-Nitroanaline	< 20.0	20.0
Acenaphthylene	< 20.0	20.0
Dimethyl phthalate	< 20.0	20.0
2,6-Dinitrotoluene	< 20.0	20.0
3-Nitroanaline	< 20.0	20.0
Acenaphthene	< 20.0	20.0
2,4-Dinitrophenol	< 100	100
4-Nitrophenol	< 20.0	20.0
Dibenzofuran	< 20.0	20.0
2,4-Dinitrotoluene	< 20.0	20.0
	mg/Kg	mg/Kg

CDF006895

G E O A n a l y t i c a l , I n c .

GEO Job# 9704102(I)-2001
Page 2 of 2

COMPOUNDS	RESULTS	REPORTING LIMIT
Diethyl phthalate	< 20.0	20.0
Fluorene	< 20.0	20.0
4-Chlorophenylphenyl ether	< 20.0	20.0
4-Nitroanaline	< 20.0	20.0
2-Methyl-4,6-dinitrophenol	< 100	100
N-Nitrosodiphenylamine	< 20.0	20.0
4-Bromphenylphenyl ether	< 20.0	20.0
Hexachlorobenzene	< 20.0	20.0
Pentachlorophenol	< 20.0	20.0
Phenanthrene	< 20.0	20.0
Anthracene	< 20.0	20.0
Carbazole	< 20.0	20.0
Di-n-butyl phthalate	< 20.0	20.0
Fluoranthene	< 20.0	20.0
Pyrene	25.2	20.0
Butyl benzyl phthalate	< 20.0	20.0
Benzo(a)anthracene	< 20.0	20.0
3,3'-Dichlorobenzidine	< 100	100
Chrysene	22.5	20.0
bis(2-Ethylhexyl) phthalate	< 20.0	20.0
Di-n-octyl phthalate	< 20.0	20.0
Benzo(b)fluoranthene	< 20.0	20.0
Benzo(k)fluoranthene	< 20.0	20.0
Benzo(a)pyrene	< 20.0	20.0
Indeno(1,2,3-cd)pyrene	< 20.0	20.0
Dibenzo(a,h)anthracene	< 20.0	20.0
Benzo(ghi)perylene	< 20.0	20.0
	mg/Kg	mg/Kg

COMPOUND	% SURROGATE RECOVERY	ACCEPTABLE RANGE
2-Fluorophenol	92	33 - 144
Phenol d5	64	62 - 120
Nitrobenzene d5	75*	80 - 132
2-Fluorobiphenyl	74	67 - 105
2,4,6-Tribromophenol	87	24 - 135
Terphenyl d14	100	49 - 141

* Indicates surrogate recovery outside of acceptable range.
***Analytical results for this sample are estimated concentration due to low surrogate recovery.

Analytical Methodology Information

EPA Method SW846-8270B, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"

Initial Calibration Date: 04/17/97-05/01/97
Continuing Calibration Date: 04/30-05/05/97
Analyst: T. Lang

REVIEWED AND APPROVED BY Christie Thomm

CDF006896

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G E O · A n a l y t i c a l , I n c .

Report Issued To: Parsons Engineering Science
19101 Villaview Road, Suite 300
Cleveland, Ohio 44119

GEO Job#: 9704102(J)-2002
Matrix Type: Soil
Samples Received: 04/22/97
Date Analyzed: 05/02-05/97
Analysis Reported: 05/06/97

Project Number: 731397.01000

Project Name: Canton Drop Forge

Sample Date: 04/18/97
Sample Description: CDF-8

GAS CHROMATOGRAPHY/MASS SPECTROMETRY FOR SEMI-VOLATILE ORGANICS IN SOIL

COMPOUNDS	RESULTS	REPORTING LIMIT
N-Nitrosodimethylamine	< 100	100
Phenol	< 20.0	20.0
2-Chlorophenol	< 20.0	20.0
bis(2-Chloroethyl)ether	< 20.0	20.0
1,3-Dichlorobenzene	< 20.0	20.0
1,4-Dichlorobenzene	< 20.0	20.0
1,2-Dichlorobenzene	< 20.0	20.0
2-Methylphenol	< 20.0	20.0
bis(2-Chloroisopropyl)ether	< 20.0	20.0
4-Methylphenol	< 20.0	20.0
Hexachloroethane	< 20.0	20.0
N-Nitroso-di-n-propylamine	< 100	100
Nitrobenzene	< 20.0	20.0
Isophorone	< 20.0	20.0
2-Nitrophenol	< 20.0	20.0
2,4-Dimethylphenol	< 20.0	20.0
bis(2-Chloroethoxy)methane	< 20.0	20.0
2,4-Dichlorophenol	< 20.0	20.0
1,2,4-Trichlorobenzene	< 20.0	20.0
Naphthalene	< 20.0	20.0
4-Chloroanaline	< 20.0	20.0
Hexachlorobutadiene	< 20.0	20.0
4-Chloro-3-methylphenol	< 20.0	20.0
2-Methylnaphthalene	< 20.0	20.0
Hexachlorocyclopentadiene	< 20.0	20.0
2,4,5-Trichlorophenol	< 20.0	20.0
2,4,6-Trichlorophenol	< 20.0	20.0
2-Chloronaphthalene	< 20.0	20.0
2-Nitroanaline	< 20.0	20.0
Acenaphthylene	< 20.0	20.0
Dimethyl phthalate	< 20.0	20.0
2,6-Dinitrotoluene	< 20.0	20.0
3-Nitroanaline	< 20.0	20.0
Acenaphthene	< 20.0	20.0
2,4-Dinitrophenol	< 100	100
4-Nitrophenol	< 20.0	20.0
Dibenzofuran	< 20.0	20.0
2,4-Dinitrotoluene	< 20.0	20.0
	mg/Kg	mg/Kg

CDF006897

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G E O . A n a l y t i c a l , I n c .

GEO Job# 9704102(J)-2002

COMPOUNDS	RESULTS	REPORTING LIMIT
Diethyl phthalate	<20.0	20.0
Fluorene	<20.0	20.0
4-Chlorophenylphenyl ether	<20.0	20.0
4-Nitroanaline	<20.0	20.0
2-Methyl-4,6-dinitrophenol	<100	100
N-Nitrosodiphenylamine	<20.0	20.0
4-Bromphenylphenyl ether	<20.0	20.0
Hexachlorobenzene	<20.0	20.0
Pentachlorophenol	<20.0	20.0
Phenanthrene	<20.0	20.0
Anthracene	<20.0	20.0
Carbazole	<20.0	20.0
Di-n-butyl phthalate	<20.0	20.0
Fluoranthene	<20.0	20.0
Pyrene	20.5	20.0
Butyl benzyl phthalate	<20.0	20.0
Benzo(a)anthracene	<20.0	20.0
3,3'-Dichlorobenzidine	<100	100
Chrysene	25.8	20.0
bis(2-Ethylhexyl) phthalate	<20.0	20.0
Di-n-octyl phthalate	<20.0	20.0
Benzo(b)fluoranthene	<20.0	20.0
Benzo(k)fluoranthene	<20.0	20.0
Benzo(a)pyrene	<20.0	20.0
Indeno(1,2,3-cd)pyrene	<20.0	20.0
Dibenzo(a,h)anthracene	<20.0	20.0
Benzo(ghi)perylene	<20.0	20.0
	mg/Kg	mg/Kg

COMPOUND	% SURROGATE RECOVERY	ACCEPTABLE RANGE
2-Fluorophenol	75	33 - 144
Phenol d5	59*	62 - 120
Nitrobenzene d5	72*	80 - 132
2-Fluorobiphenyl	102	67 - 105
2,4,6-Tribromophenol	85	24 - 135
Terphenyl d14	92	49 - 141

* Indicates surrogate recovery outside of acceptable range.
***Analytical results for this sample are estimated concentration due to low surrogate recovery.

Analytical Methodology Information

EPA Method SW846-8270B, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"

Initial Calibration Date: 05/01/97
Continuing Calibration Date: 05/02-05/97
Analyst: T. Lang

REVIEWED AND APPROVED BY: Christie Thaxton

CDF006898

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GEO Analytical, Inc.

Report Issued To: Parsons Engineering Science
19101 Villaview Road, Suite 300
Cleveland, Ohio 44119

GEO Job#	9704102(K)-2003	Project Number:	731397.01000
Matrix Type:	Soil		
Samples Received:	04/22/97	Project Name:	Canton Drop Forge
Date Analyzed:	05/02-05/97		
Analysis Reported:	05/06/97		

Sample Date: 04/18/97
Sample Description: CDF-9

GAS CHROMATOGRAPHY/MASS SPECTROMETRY FOR SEMI-VOLATILE ORGANICS IN SOIL

COMPOUNDS	RESULTS	REPORTING LIMIT
N-Nitrosodimethylamine	< 100	100
Phenol	< 20.0	20.0
2-Chlorophenol	< 20.0	20.0
bis(2-Chloroethyl)ether	< 20.0	20.0
1,3-Dichlorobenzene	< 20.0	20.0
1,4-Dichlorobenzene	< 20.0	20.0
1,2-Dichlorobenzene	< 20.0	20.0
2-Methylphenol	< 20.0	20.0
bis(2-Chloroisopropyl)ether	< 20.0	20.0
4-Methylphenol	< 20.0	20.0
Hexachloroethane	< 20.0	20.0
N-Nitroso-di-n-propylamine	< 100	100
Nitrobenzene	< 20.0	20.0
Isophorone	< 20.0	20.0
2-Nitrophenol	< 20.0	20.0
2,4-Dimethylphenol	< 20.0	20.0
bis(2-Chloroethoxy)methane	< 20.0	20.0
2,4-Dichlorophenol	< 20.0	20.0
1,2,4-Trichlorobenzene	< 20.0	20.0
Naphthalene	< 20.0	20.0
4-Chloroanaline	< 20.0	20.0
Hexachlorobutadiene	< 20.0	20.0
4-Chloro-3-methylphenol	< 20.0	20.0
2-Methylnaphthalene	< 20.0	20.0
Hexachlorocyclopentadiene	< 20.0	20.0
2,4,5-Trichlorophenol	< 20.0	20.0
2,4,6-Trichlorophenol	< 20.0	20.0
2-Chloronaphthalene	< 20.0	20.0
2-Nitroanaline	< 20.0	20.0
Acenaphthylene	< 20.0	20.0
Dimethyl phthalate	< 20.0	20.0
2,6-Dinitrotoluene	< 20.0	20.0
3-Nitroanaline	< 20.0	20.0
Acenaphthene	< 20.0	20.0
2,4-Dinitrophenol	< 100	100
4-Nitrophenol	< 20.0	20.0
Dibenzofuran	< 20.0	20.0
2,4-Dinitrotoluene	< 20.0	20.0
	mg/Kg	mg/Kg

CDF006899

G E O A n a l y t i c a l , I n c .

GEO Job#: 9704102(K)-2003

COMPOUNDS	RESULTS	REPORTING LIMIT
Diethyl phthalate	< 20.0	20.0
Fluorene	< 20.0	20.0
4-Chlorophenylphenyl ether	< 20.0	20.0
4-Nitroanaline	< 20.0	20.0
2-Methyl-4,6-dinitrophenol	< 100	100
N-Nitrosodiphenylamine	< 20.0	20.0
4-Bromphenylphenyl ether	< 20.0	20.0
Hexachlorobenzene	< 20.0	20.0
Pentachlorophenol	< 20.0	20.0
Phenanthrene	< 20.0	20.0
Anthracene	< 20.0	20.0
Carbazole	< 20.0	20.0
Di-n-butyl phthalate	< 20.0	20.0
Fluoranthene	< 20.0	20.0
Pyrene	22.5	20.0
Butyl benzyl phthalate	< 20.0	20.0
Benzo(a)anthracene	< 20.0	20.0
3,3'-Dichlorobenzidine	< 100	100
Chrysene	22.1	20.0
bis(2-Ethylhexyl) phthalate	< 20.0	20.0
Di-n-octyl phthalate	< 20.0	20.0
Benzo(b)fluoranthene	< 20.0	20.0
Benzo(k)fluoranthene	< 20.0	20.0
Benzo(a)pyrene	< 20.0	20.0
Indeno(1,2,3-cd)pyrene	< 20.0	20.0
Dibenzo(a,h)anthracene	< 20.0	20.0
Benzo(ghi)perylene	< 20.0	20.0
	mg/Kg	mg/Kg

COMPOUND	% SURROGATE RECOVERY	ACCEPTABLE RANGE
2-Fluorophenol	80	33 - 144
Phenol d5	60*	62 - 120
Nitrobenzene d5	76*	80 - 132
2-Fluorobiphenyl	92	87 - 105
2,4,6-Tribromophenol	71	24 - 135
Terphenyl -d14	94	49 - 141

* Indicates surrogate recovery outside of acceptable range.
***Analytical results for this sample are estimated concentration due to low surrogate recovery.

Analytical Methodology Information

EPA Method SW846-8270B, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"

Initial Calibration Date: 05/01/97
Continuing Calibration Date: 05/02-05/97
Analyst: T. Lang

REVIEWED AND APPROVED BY Christi Thoxm

CDF006900

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G E O A n a l y t i c a l , I n c .

Report Issued To: Parsons Engineering Science
19101 Villaview Road, Suite 300
Cleveland, Ohio 44119

GEO Job#:	9704102(L)-2004	Project Number:	731397.01000
Matrix Type:	Soil		
Samples Received:	04/22/97	Project Name:	Canton Drop Forge
Date Analyzed:	05/02/97		
Analysis Reported:	05/06/97		

Sample Date: 04/18/97
Sample Description: CDF-10

GAS CHROMATOGRAPHY/MASS SPECTROMETRY FOR SEMI-VOLATILE ORGANICS IN SOIL

COMPOUNDS	RESULTS	REPORTING LIMIT
N-Nitrosodimethylamine	< 100	100
Phenol	< 20.0	20.0
2-Chlorophenol	< 20.0	20.0
bis(2-Chloroethyl)ether	< 20.0	20.0
1,3-Dichlorobenzene	< 20.0	20.0
1,4-Dichlorobenzene	< 20.0	20.0
1,2-Dichlorobenzene	< 20.0	20.0
2-Methylphenol	< 20.0	20.0
bis(2-Chloroisopropyl)ether	< 20.0	20.0
4-Methylphenol	< 20.0	20.0
Hexachloroethane	< 20.0	20.0
N-Nitroso-di-n-propylamine	< 100	100
Nitrobenzene	< 20.0	20.0
Isophorone	< 20.0	20.0
2-Nitrophenol	< 20.0	20.0
2,4-Dimethylphenol	< 20.0	20.0
bis(2-Chloroethoxy)methane	< 20.0	20.0
2,4-Dichlorophenol	< 20.0	20.0
1,2,4-Trichlorobenzene	< 20.0	20.0
Naphthalene	< 20.0	20.0
4-Chloroanaline	< 20.0	20.0
Hexachlorobutadiene	< 20.0	20.0
4-Chloro-3-methylphenol	< 20.0	20.0
2-Methylnaphthalene	< 20.0	20.0
Hexachlorocyclopentadiene	< 20.0	20.0
2,4,5-Trichlorophenol	< 20.0	20.0
2,4,6-Trichloropherol	< 20.0	20.0
2-Chloronaphthalene	< 20.0	20.0
2-Nitroanaline	< 20.0	20.0
Acenaphthylene	< 20.0	20.0
Dimethyl phthalate	< 20.0	20.0
2,6-Dinitrotoluene	< 20.0	20.0
3-Nitroanaline	< 20.0	20.0
Acenaphthene	< 20.0	20.0
2,4-Dinitrophenol	< 20.0	20.0
4-Nitrophenol	< 100	100
Dibenzofuran	< 20.0	20.0
2,4-Dinitrotoluene	< 20.0	20.0
	mg/Kg	mg/Kg

CDF006901

G E O A n a l y t i c a l, I n c.

GEO Job# · 9704102(L)-2004

COMPOUNDS	RESULTS	REPORTING LIMIT
Diethyl phthalate	<20.0	20.0
Fluorene	<20.0	20.0
4-Chlorophenylphenyl ether	<20.0	20.0
4-Nitroanaline	<20.0	20.0
2-Methyl-4,6-dinitrophenol	<100	100
N-Nitrosodiphenylamine	<20.0	20.0
4-Bromphenylphenyl ether	<20.0	20.0
Hexachlorobenzene	<20.0	20.0
Pentachlorophenol	<20.0	20.0
Phenanthrene	<20.0	20.0
Anthracene	<20.0	20.0
Carbazole	<20.0	20.0
Di-n-butyl phthalate	<20.0	20.0
Fluoranthene	<20.0	20.0
Pyrene	<20.0	20.0
Butyl benzyl phthalate	<20.0	20.0
Benzo(a)anthracene	<20.0	20.0
3,3'-Dichlorobenzidine	<100	100
Chrysene	<20.0	20.0
bis(2-Ethylhexyl) phthalate	<20.0	20.0
Di-n-octyl phthalate	<20.0	20.0
Benzo(b)fluoranthene	<20.0	20.0
Benzo(k)fluoranthene	<20.0	20.0
Benzo(a)pyrene	<20.0	20.0
Indeno(1,2,3-cd)pyrene	<20.0	20.0
Dibenzo(a,h)anthracene	<20.0	20.0
Benzo(ghi)perylene	<20.0	20.0
	mg/Kg	mg/Kg.

COMPOUND	% SURROGATE RECOVERY	ACCEPTABLE RANGE
2-Fluorophenol	88	33 - 144
Phenol d5	76	62 - 120
Nitrobenzene d5	90	80 - 132
2-Fluorobiphenyl	98	67 - 105
2,4,6-Tribromophenol	98	24 - 135
Terphenyl d14	82	49 - 141

* Indicates surrogate recovery outside of acceptable range.

Analytical Methodology Information

EPA Method SW846-8270B, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"

Initial Calibration Date: 05/01/97
Continuing Calibration Date: 05/02/97
Analyst: T. Lang

REVIEWED AND APPROVED BY Christine Thaxton

CDF006902

9263 Ravenna Rd. • Suite A-7 • Twinsburg, Ohio 44087 • Phone 216 963 6990 • Fax 216 963 6975

G E O . A n a l y t i c a l , I n c .

Report Issued To: Parsons Engineering Science
19101 Villaview Road, Suite 300
Cleveland, Ohio 44119

GEO Job#:	9704102(C)-1995	Project Number:	731397.01000
Matrix Type:	Soil		
Samples Received:	04/22/97	Project Name:	Canton Drop Forge
Date Analyzed:	04/30-05/02/97		
Analysis Reported:	05/06/97		

Sample Date: 04/18/97
Sample Description: CDF-1

GAS CHROMATOGRAPHY/MASS SPECTROMETRY FOR SEMI-VOLATILE ORGANICS IN SOIL

COMPOUNDS	RESULTS	REPORTING LIMIT
N-Nitrosodimethylamine	< 100	100
Phenol	< 20.0	20.0
2-Chlorophenol	< 20.0	20.0
bis(2-Chloroethyl)ether	< 20.0	20.0
1,3-Dichlorobenzene	< 20.0	20.0
1,4-Dichlorobenzene	< 20.0	20.0
1,2-Dichlorobenzene	< 20.0	20.0
2-Methylphenol	< 20.0	20.0
bis(2-Chloroisopropyl)ether	< 20.0	20.0
4-Methylphenol	< 20.0	20.0
Hexachloroethane	< 20.0	20.0
N-Nitroso-di-n-propylamine	< 100	100
Nitrobenzene	< 20.0	20.0
Isophorone	< 20.0	20.0
2-Nitrophenol	< 20.0	20.0
2,4-Dimethylphenol	< 20.0	20.0
bis(2-Chloroethoxy)methane	< 20.0	20.0
2,4-Dichlorophenol	< 20.0	20.0
1,2,4-Trichlorobenzene	< 20.0	20.0
Naphthalene	< 20.0	20.0
4-Chloroanaline	< 20.0	20.0
Hexachlorobutadiene	< 20.0	20.0
4-Chloro-3-methylphenol	< 20.0	20.0
2-Methylnaphthalene	< 20.0	20.0
Hexachlorocyclopentadiene	< 20.0	20.0
2,4,5-Trichlorophenol	< 20.0	20.0
2,4,6-Trichlorophenol	< 20.0	20.0
2-Chloronaphthalene	< 20.0	20.0
2-Nitroanaline	< 20.0	20.0
Acenaphthylene	< 20.0	20.0
Dimethyl phthalate	< 20.0	20.0
2,6-Dinitrotoluene	< 20.0	20.0
3-Nitroanaline	< 20.0	20.0
Acenaphthene	< 20.0	20.0
2,4-Dinitrophenol	< 100	100
4-Nitrophenol	< 20.0	20.0
Dibenzofuran	< 20.0	20.0
2,4-Dinitrotoluene	< 20.0	20.0
	mg/Kg	mg/Kg

CDF006903

APPENDIX B:

RESULTS OF GEOTECHNICAL ANALYSES
AND STABILITY TESTING
FROM APPLIED CONSTRUCTION TECHNOLOGIES, INC.

FOR

CANTON DROP FORGE, INC.
CANTON, OHIO

MAY 1997

2(b)
3

ENGINEERING • TESTING • INSPECTION

APPLIED CONSTRUCTION TECHNOLOGIES, INC.

210 HAYES DRIVE • SUITE C • CLEVELAND, OHIO 44131 • (216) 459-TEST • FAX (216) 459-8954
478 E. EXCHANGE ST. • SUITE 202 • AKRON, OHIO 44304 • (216) 253-TEST • FAX (216) 253-3462

May 12, 1997

Parsons Engineering Science, Inc.
19101 Villaview Road, Suite 301
Cleveland, Ohio 44119

Attention: Mr. Rick Volpi

SUBJECT: LABORATORY TEST RESULTS
OILY CLAYEY GRAVEL AND SAND FROM
CANTON DROP FORGE

ACT PROJECT NO. 9705.08

Enclosed are the laboratory test results which have been completed on the sample of black oily clayey gravel and sand which was submitted to us on April 18, 1997. Reportedly the material is from Canton Drop Forge and the material is to be placed within a clay lined and capped cell for biological treatment.

It is our understanding that in its present condition the material is very difficult to work with and is not expected to be stable enough to construct a compacted clay cap over it. To improve its stability, we mixed various mixtures of lime and fly ash into the oily waste material. The granular nature of the material made it unsuitable for compression testing; therefore, the stability of the oily waste and the various mixtures of lime, fly ash, and waste were determined by conducting California Bearing Ratio tests (ASTM D1883). The test results are summarized below:

	Compacted Density	CBR
Oily Waste without Lime and Fly Ash	127.8 pcf	2.7
Oily Waste with 2 % Lime and 10% Fly Ash	120.9 pcf	10.4
Oily Waste with 6 % Lime and 22.5 % Fly Ash	115.5 pcf	10.0
Oily Waste with 10 % Lime and 35 % Fly Ash	108.4 pcf	9.3

The test results indicate that the stability of the material can be greatly improved with the addition of minor amounts of lime and fly ash. The stability of the mixture did not improve when larger amounts of lime and fly ash were used.

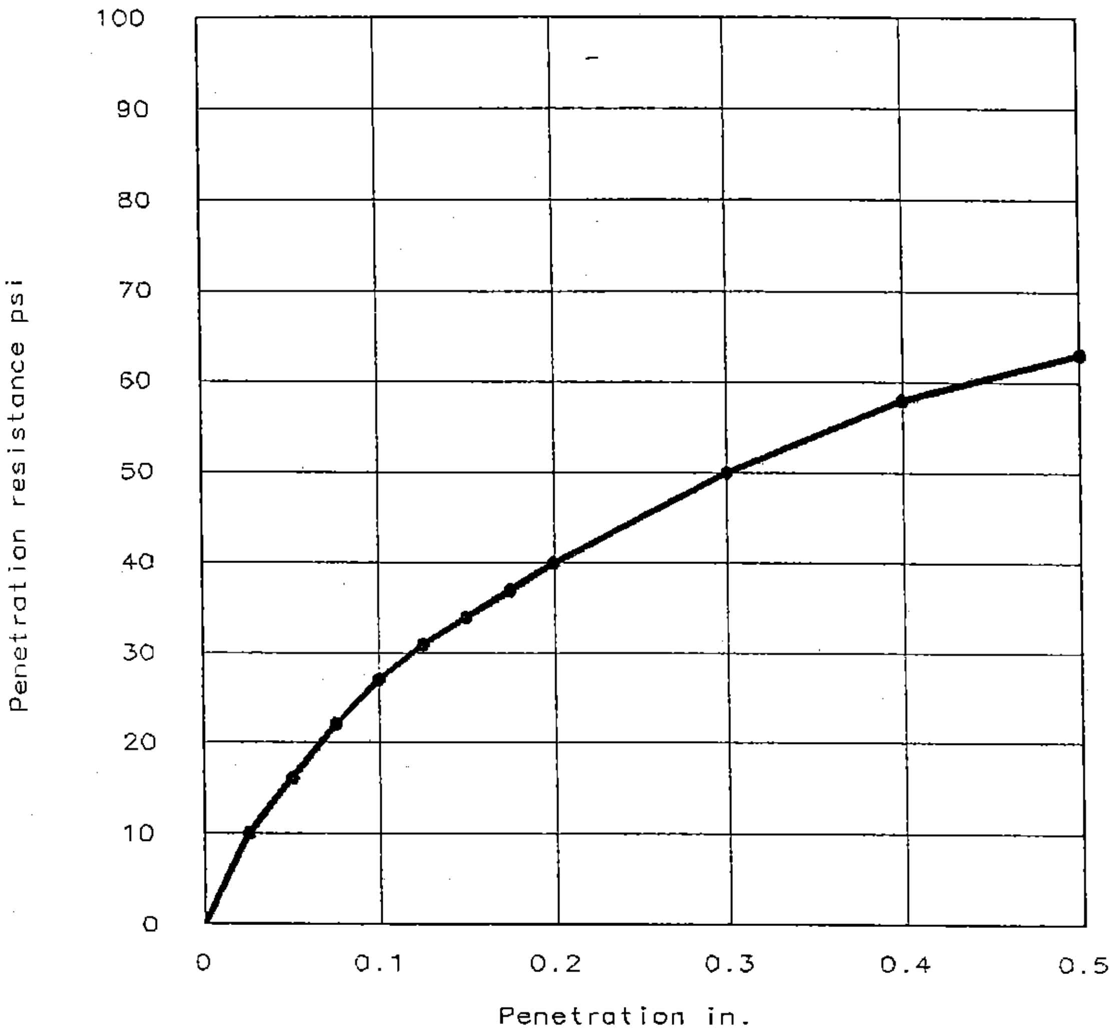
Based on the test results, a properly blended mixture of the oily waste with 2 % lime and 10 % fly ash would be expected to compact readily and be stable under normal construction equipment.

Should you have any questions concerning these test results, please do not hesitate to contact us.

APPLIED CONSTRUCTION TECHNOLOGIES, INC.
by:

Lynton L. Price, P.E.
Director of Engineering

BEARING RATIO TEST REPORT



	Molded			Soaked			CBR (%)		Penet.	Swell
	Dens.	% max	moist	Dens.	% max	moist	0.1"	0.2"	Surcharge	%
1 ●	127.8		3.5%	128.1		4.7%	2.7	2.7	14.93 lbs.	0.0
2 ▲										
3 ■										

MATERIAL DESCRIPTION	USCS	Max. dens.	Opt. w.c.	LL	PI
OILY, CLAYEY GRAVEL & SAND					

Project No: 9705.08
Project: CANTON DROP FORGE
Location: BIOCELL
CLIENT: PARSONS ENGINEERING SCIENCE,INC.
Date: 5/6/97

BEARING RATIO TEST REPORT

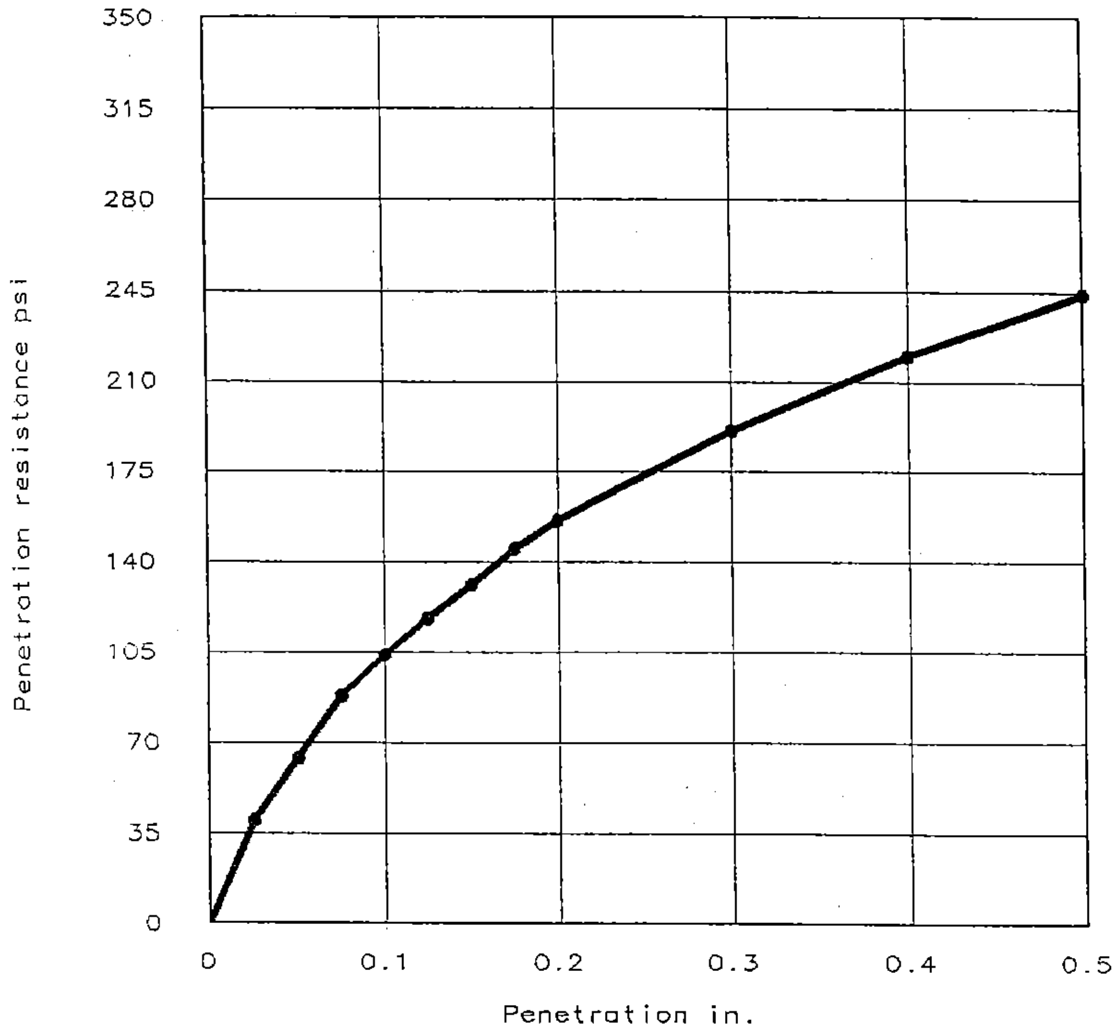
APPLIED CONSTRUCTION TECHNOLOGIES, INC.

Test Descr./Remarks:

BULK SAMPLE
SUBMITTED TO US BY
PARSONS ENGINEERING
SCIENCE ON 4-18-97

Fig. No.

BEARING RATIO TEST REPORT



	Molded			Soaked			CBR (%)		Penet.	Swell
	Dens.	% max	moist	Dens.	% max	moist	0.1"	0.2"	Surcharge	%
1 ●	120.9		5.4%	120.9		7.6%	10.4	10.4	15.07 lbs.	0.4
2 ▲										
3 ■										

MATERIAL DESCRIPTION	USCS	Max. dens.	Opt. w.c.	LL	PI
OILY, CLAYEY GRAVEL&SAND, WTH 10%FLYASH, 2%LIME					

Project No: 9705.08
Project: CANTON DROP FORGE
Location: BIOCELL
CLIENT: PARSONS ENGINEERING SCIENCE, INC.
Date: 5-9-97

BEARING RATIO TEST REPORT

APPLIED CONSTRUCTION TECHNOLOGIES, INC.

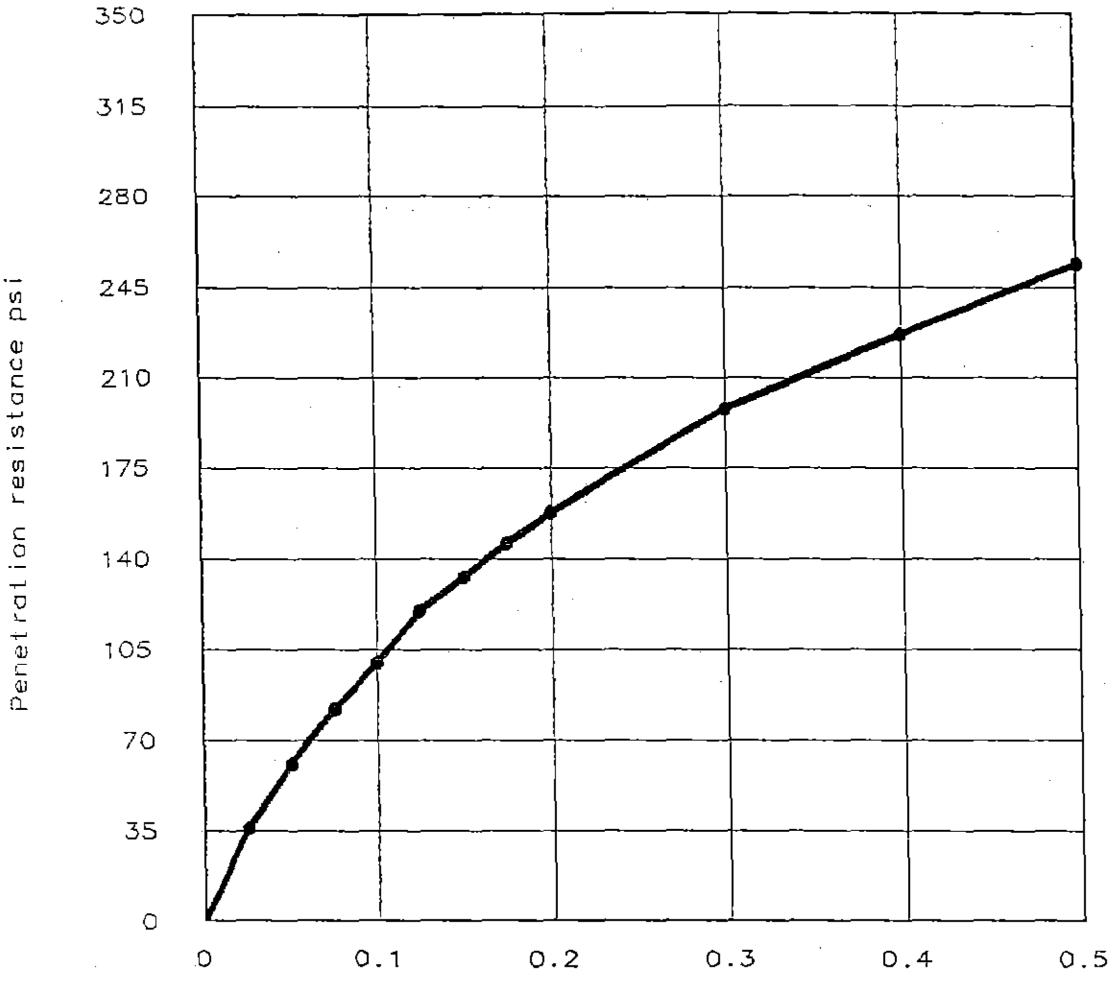
Test Descr./Remarks:
ASTM-D 1883

BULK SAMPLE SUBMITTED TO US BY PARSONS ENGINEERING SCIENCE ON 4-18-97

Fig. No.

CDF006908

BEARING RATIO TEST REPORT



	Molded			Soaked			CBR (%)		Penet.	Swell
	Dens.	% max	moist	Dens.	% max	moist	0.1"	0.2"	Surcharge	%
1 ●	115.5		3.2%	114.5		10.1%	10.0	10.5	15.01 lbs.	0.9
2 ▲										
3 ■										

MATERIAL DESCRIPTION	USCS	Max. dens.	Opt. w.c.	LL	PI
OILY,CLAYEY GRAVEL&SAND,WTH22.5%FLYASH6%LIME					

Project No: 9705.08
Project: CANTON DROP FORGE
Location: BIOCELL
CLIENT: PARSONS ENGINEERING SCIENCE,INC.
Date: 5-9-97

BEARING RATIO TEST REPORT

APPLIED CONSTRUCTION TECHNOLOGIES, INC.

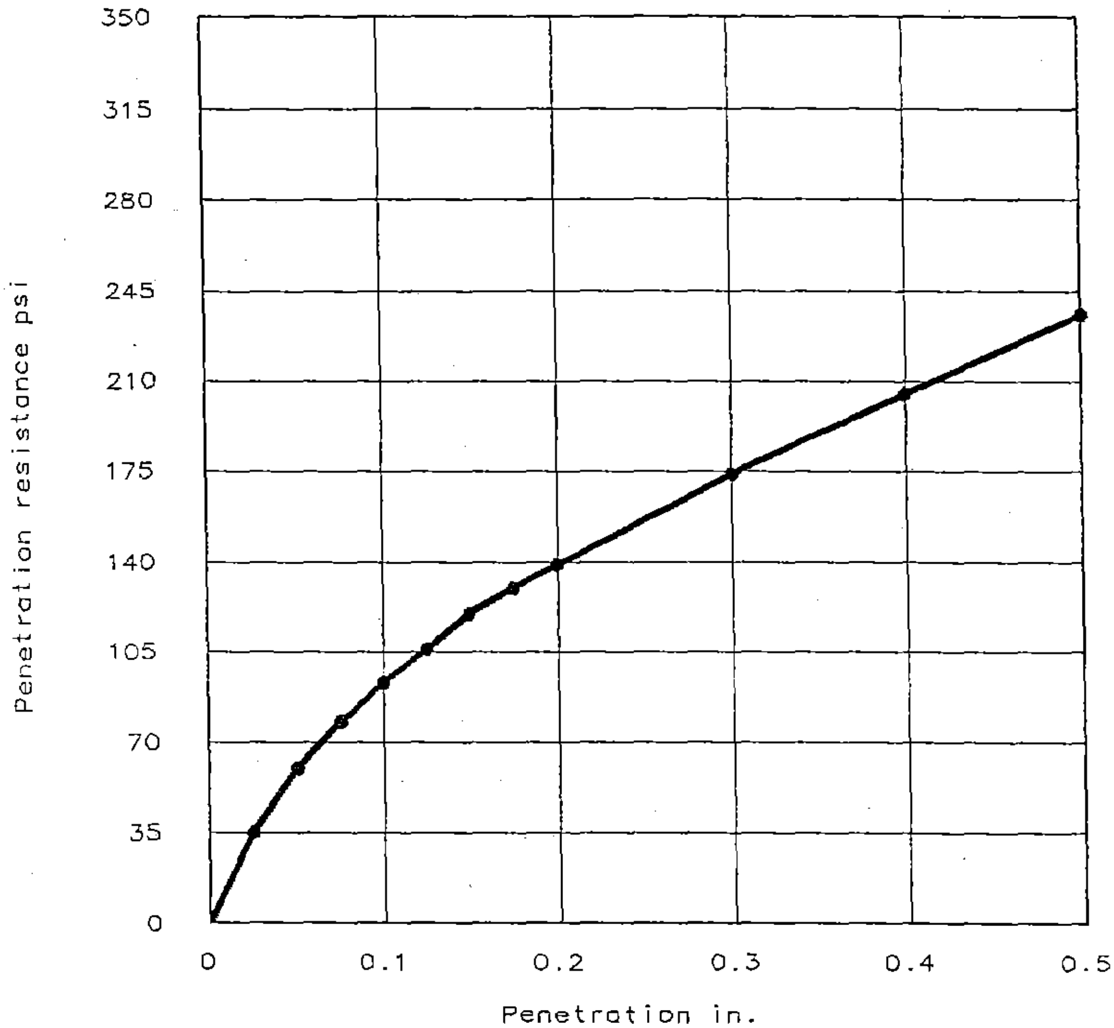
Test Descr./Remarks:
ASTM-D 1883

BULK SAMPLE
SUBMITTED BY PARSONS
ENGINEERING SCIENCE
ON 4-18-97

Fig. No.

CDF006909

BEARING RATIO TEST REPORT



	Molded			Soaked			CBR (%)		Penet.	Swell
	Dens.	% max	moist	Dens.	% max	moist	0.1"	0.2"	Surcharge	%
1 ●	108.4		4.1%	107.5		14.1%	9.3	9.3	15.07 lbs.	0.9
2 ▲										
3 ■										

MATERIAL DESCRIPTION	USCS	Max. dens.	Opt. w.c.	LL	PI
OILY,CLAYEY GRAVEL&SAND WTH 35%FLYASH10%LIME					

Project No: 9705.08

Project: CANTON DROP FORGE

Location: BIOCELL

CLIENT: PARSONS ENGINEERING SCIENCE,INC.

Date: 5-9-97

Test Descr./Remarks:

ASTM-D 1883

BULK SAMPLE
SUBMITTED BY PARSONS
ENGINEERING SCIENCE
ON 4-18-97

BEARING RATIO TEST REPORT

APPLIED CONSTRUCTION TECHNOLOGIES, INC.

Fig. No.

CDF006910

2(b)
3

APPENDIX C:

CRITERIA FOR SCREENING ALTERNATIVES FOR CANTON DROP FORGE, INC. LAGOON #1 RE-CONSTRUCTION AND BIOCELL DISPOSAL PROJECT

**CRITERIA FOR SCREENING
ALTERNATIVES FOR
CANTON DROP FORGE, INC.
LAGOON #1 RE-CONSTRUCTION AND BIOCELL
DISPOSAL PROJECT**

Described below are the criteria used for screening the six (6) alternatives considered for the CDF Lagoon #1 re-construction and biocell disposal project and their applications in evaluating these options.

Economic Impact

This criterion considers budget-level unit costs of implementing the six alternatives. These analyses take into account the total costs for addressing the Lagoon #1 re-construction and disposal of biocell material, divided by the estimated volume of the biocell, including the additional material to be removed from Lagoon #1, (i.e., about 5,500 tons). The calculation also takes into account any credits which may be realized for re-use of the biocell material.

Rating structure 1 is > $50 / ton
2 is $35 to $50 / ton
3 is $25 to $35 / ton
4 is $10 to $25 / ton
5 is < $10 / ton

In Option a, costs to test, load, transport, dump (including excise taxes) the biocell material are projected at about $21/ton. Additional expenses are required to reconstruct Lagoon #1, estimated at about $12/ton. (**Note**: This estimate will also be used for Lagoon #1 re-construction in Options b, c, d and e).

In Options d and e, costs to test, screen, fluidize (optional only), load, transport and transfer the material are partial offset by the value the receiving facility placed on it. About $40/ton in total costs (including those for Lagoon #1) are partial offset by credits of about $5/ton for recovered hydrocarbon value in Option d and about $15/ton for displaced raw materials needed in Option e.

Please refer to Table 4 for costs estimated for Option f (about $21/ton).

Schedule Impact

This criterion considers the total time, commencing from CDF's authorization, to complete engineering, procurement, permitting (or other third-party approvals), implementation and closure of the alternatives.

Rating structure 1 is > 8 months
2 is 6 to 8 months
3 is 4 to 6 months
4 is 2 to 4 months
5 is <2 months

It is envisaged that, since Options b, c and f are largely within CDF's control and for Option a significant delays are not anticipated getting landfill approval for disposal of this (previously characterized) non-hazardous material, these actions can be completed within 2 to 4 months. Options d and e are anticipated to require longer periods of time to test, verify quality, get third-party approvals (i.e., from Ashland or asphalt plant) and to fit within their operating schedules. To avoid subsequent re-handling of the material, direct feed to their presses will be required, causing delays in completion.

Technical Feasibility

Technical feasibility takes into account the implementability of the proposed options. The rating is entirely subjective with factors identified regarding the ease or difficulty anticipated.

Rating structure
1 is very difficult to implement
2 is somewhat difficult to implement
3 has neutral difficulty for implementation
4 is reasonably easy to implement
5 is most easily implemented

It is anticipated that Options a, b and f will be reasonably easy to implement. Although there are small risks of failure, these approaches has been completed many times without significant problems. Options c and e have also been attempted before, but the risks of failure (from experience) are higher. For Option c, long-term degradation of the stabilized material may produce undesired results (i.e., leaching and/or structural failure), due to exposure to traffic and the elements. For Option e, difficulty in maintaining stability of the subject material has not been tested and, hence, is uncertain. Option d poses the greatest risks of potential failure, primarily due to the variability in hydrocarbon content, texture, sizing, etc., of the material and the degree of pre-processing which will be required to ensure its satisfactory use in this application. Further consideration of Option d is probably unwarranted.

Stakeholder Acceptance

In this criterion, we attempt to evaluate the acceptability of each option to the myriad of parties which (may) have an interest in this project. The assumed stakeholders are: CDF; regulatory agencies, including Ohio EPA and USEPA; potential customers, including Ashland or the asphalt plant; and neighboring property owners.

Rating structure
1 anticipates potentially insurmountable objectives
2 anticipates some objection
3 is neutral with regards to acceptance
4 is generally acceptable
5 projects complete acceptance

Most of the options (a, b, d and e) are perceived to be neutral with respect to acceptability; there are no known issues or concerns which could prohibit their application. Option c is perceived as potentially less acceptable since the stabilized material will be placed in areas subject to traffic and scrutiny (see also the concern regarding long-term stability). Option f is perceived as the most acceptable in that it permits CDF to address two issues simultaneously (i.e., with one set of actions), does not involve external scrutiny and leaves no biocell material exposed to traffic, the elements or scrutiny.

Permitting Requirements

This assessment addresses the probable need for permits or third-party approvals.

Rating structure	1 anticipates substantial/very difficult requirements
	2 anticipates somewhat difficult requirements
	3 anticipates moderate requirements
	4 anticipates minor requirements
	5 anticipates no permitting required

For Options, c and f, no external approvals or permit requirements are anticipated. For Options a, d and e, third-party approvals are required from the receiving facilities.

RECOMMENDED OPTION

Conceptual Design

The conceptual design for the preferred option includes implementation of the following steps. Figure 2 provides a profile view of the resulting conceptual design. To implement this design, we recommend that CDF plan to:

- remove any residual oily soil which remains in Lagoon #1 and transfer it to the biocell;
- re-grade Lagoon #1, as necessary, to assure that the side-walls are stable;
- place and compact a 12-inch layer of clay, in two 6-inch lifts, to provide an impermeable lining in the Lagoon #1 excavation;
- in the biocell, add and mix 2% lime and 10% fly ash with the oily soil to stabilize it;
- transfer the stabilized mixture from the biocell to Lagoon #1;
- place and compact the stabilized biocell material in Lagoon #1; and
- place and compact one additional 6-inch layer of clay to cap and seal the surface of Lagoon #1.

Depending on the final size of Lagoon #1, excess stabilized biocell material may be available. Drainage and traffic considerations must be taken into account for the possible locations for on-site placement and compaction of this material. Appropriate consideration of these factors will preclude future erosion of this material from the property.

Budgetary Cost Estimate

Parsons ES has developed, working in conjunction with Beaver Excavating Company, a budgetary cost estimate (i.e., within +/- 15%) of $139,000 for the recommended option. This estimate is based on the assumptions that: $118,000/160,000

- about 3000 cubic yards of oily soil are available for stabilization in the biocell;
- about 600 cubic yards of additional oily soil must yet be removed from Lagoon #1;
- about 720 cubic yards of lime and flyash will be required to stabilize the biocell material; and
- about 600 cubic yards of clay will be required for the upper and lower layers lining the re-constructed Lagoon #1.

Table 4 contains the cost estimate, provided by major cost category. As an alternate, the base case of disposing of the biocell material in the American Landfill at Waynesburg (or alternatively at Central Waste in Alliance), with reconstruction of Lagoon #1 with virgin materials, is about $189,000.

Preliminary Schedule

It is projected that this recommended option, for re-constructing Lagoon #1 and addressing the disposition of the biocell material concurrently, can be accomplished within 9 to 10 weeks after CDF's issuance of an order to proceed. In particular, the final design for Lagoon #1 can be completed within 3-4 weeks. The construction phase of the project is anticipated to require about six (6) weeks.

2(b)
3

American Landfill, Inc.

An American Waste Services Company

One American Way • Warren, OH 44484-5555 • Phone: (330) 856-8800 • Fax: (330) 856-8483

May 15, 1997

Via Facsimile #216-486-6119

Mr. Rick Volpi
Parsons Engineering Science
19101 Villaview Road, Suite 301
Cleveland, Ohio 44119

RE: Transportation and Disposal of TPH Contaminated Soil
American Waste Services I.D. #21707-1

Dear Mr. Volpi:

American Landfill, Inc. is pleased to quote pricing for transportation and disposal of TPH Contaminated Soils (non-hazardous) from your project in Canton, OH (Stark County). Pricing is as follows:

Transportation & Disposal: $20.50 per ton, which includes current Ohio disposal fees.
Transportation provided by Envirco Transportation Management, Inc. (#29859)

1) Material deemed to contain liquids may incur additional charges.
2) Liner is included.
3) 22 ton minimum per truck.
4) Demurrage Fee: Two hours free at each end and $60.00 per hour thereafter
5) Failure to load scheduled trucks may result in "no load" charges.
6) Five rounds per truck per day.

The above pricing is based on the information supplied and also subject to approval of this waste at American Landfill, Inc. These prices are valid for thirty (30) days from date of this letter.

Invoicing and taxes will be based upon weight tickets generated by certified scales. Payment for services performed shall be made within fifteen (15) days of receipt of invoice.

Parsons Engineering Service will be responsible for all applicable sales taxes, waste disposal taxes, and transportation taxes other than those included above. Any increase in taxes will be passed on to Parsons Engineering Service.

If you have any questions, please do not hesitate to contact me at (330) 856-8800. I look forward to servicing your disposal needs.

Sincerely,

Robert Lehman

Robert A. Lehman JH
Territory Sales Manager

RAL:jh:ALI.21707

CDF006916

AMERICAN WASTE SERVICES, INC.
One American Way • Warren, Ohio 44484-5555
PHONE (330) 856-8800
FAX (330) 856-8480

Date: May 15, 1997

To: Rick Volpi

Company: Parsons Engineering Service

FAX No.: (216) 486-6119

From: Bob Lehman

Company: American Waste Services, Inc.

Message: Transportation + disposal of TPH Contaminated Soil
Invoice will follow.

Total number of pages: 2 (including this cover page).

2(b)
3

WKC re disposal of bio cell matt & restoration of lagoon! Jere

PARSONS ENGINEERING SCIENCE, INC.

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

DATE: 5/20/97

Reference & JPB - Looks like these guys [illegible] [illegible] these are [illegible] WKC 6/17

TO: MR. KEITH HOUSEKNECHT

LOCATION: CANTON DROP FORGE

RAPIDFAX NO.: (330) 477-2046

COPIES TO:

FROM: ED KARKALIK

TOTAL NUMBER OF PAGES 5 (including this cover letter)

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL BACK AS SOON AS POSSIBLE.

We are herewith transmitting the following:

DATE	NO.	DESCRIPTION
		Revised p.5, Table 3, Table 4 and p1 of
		Appendix C of Report

Keith -

Attached are revised versions of the above-listed four (4) sheets of our draft Report, as discussed during our meet last Friday (5/16/97). These have been adjusted / revised to reflect the items discussed and conversations with and/or information received from American Landfill (at Waynesb..., Beaver Excavating, and Ohio EPA (on a non-disclosure basis) since our meeting.

Please note that the costs of stabilizing the biocell material and placing same into Lagoon #1 have been adjusted and firmed to within a +/- 15% range. Costs for landfill disposal have similarly been refined. Also please note that American Land... (and Central Waste in Alliance) have indicated that the biocell materi... cannot be used for (daily) cover in that the TPH is too high, the material is too granular and it reduces space in the landfill.

Ed Karkalik

JOB NO. 731397.01000

02000002

CDF006918

Fax to Rick Zollinger 5 pages 5/20/97 2(b) 3

PARSONS ENGINEERING SCIENCE, INC.

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

DATE: 5/20/97

TO: MR. KEITH HOUSEKNECHT
LOCATION: CANTON DROP FORGE
RAPIDFAX NO.: (330) 477-2046
COPIES TO:

FROM: ED KARKALIK

TOTAL NUMBER OF PAGES 5 (including this cover letter)

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL BACK AS SOON AS POSSIBLE.

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Keith –

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Please note that the costs of stabilizing the biocell material and placing same into Lagoon #1 have been adjusted and firmed to within a +/- 15% range. Costs for landfill disposal have similarly been refined. Also please note that American Land- (and Central Waste in Alliance) have indicated that the biocell materi. cannot be used for (daily) cover in that the TPH is too high, the material is too granular and it reduces space in the landfill.

Ed Karkalik

JOB NO. 731397.01000

02000C02

CDF006919

CRITERIA FOR SCREENING ALTERNATIVES FOR CANTON DROP FORGE, INC. LAGOON #1 RE-CONSTRUCTION AND BIOCELL DISPOSAL PROJECT

Described below are the criteria used for screening the six (6) alternatives considered for the CDF Lagoon #1 re-construction and biocell disposal project and their applications in evaluating these options.

Economic Impact

This criterion considers budget-level unit costs of implementing the six alternatives. These analyses take into account the total costs for addressing the Lagoon #1 re-construction and disposal of biocell material, divided by the estimated volume of the biocell, including the additional material to be removed from Lagoon #1, (i.e., about 5,500 tons). The calculation also takes into account any credits which may be realized for re-use of the biocell material.

Rating structure	1 is > $50 / ton
	2 is $35 to $50 / ton
	3 is $25 to $35 / ton
	4 is $10 to $25 / ton
	5 is < $10 / ton

In Option a, costs to test, load, transport, dump (including excise taxes) the biocell material are projected at about $21/ton. Additional expenses are required to reconstruct Lagoon #1, estimated at about $12/ton. (**Note**: This estimate will also be used for Lagoon #1 re-construction in Options b, c, d and e).

In Options d and e, costs to test, screen, fluidize (optional only), load, transport and transfer the material are partial offset by the value the receiving facility placed on it. About $40/ton in total costs (including those for Lagoon #1) are partial offset by credits of about $5/ton for recovered hydrocarbon value in Option d and about $15/ton for displaced raw materials needed in Option e.

Please refer to Table 4 for costs estimated for Option f (about $21/ton).

Schedule Impact

This criterion considers the total time, commencing from CDF's authorization, to complete engineering, procurement, permitting (or other third-party approvals), implementation and closure of the alternatives.

Rating structure	1 is > 8 months
	2 is 6 to 8 months
	3 is 4 to 6 months
	4 is 2 to 4 months
	5 is <2 months

TABLE 3
CANTON DROP FORGE, INC. PLANT, CANTON, OHIO
LAGOON #1 RE-CONSTRUCTION / BIOCELL DISPOSITION OPTIONS

Indicator	Description of Options	Subjective Evaluation (1-5, with 5= best)					
		Economic Impact[1]	Scheduling Impact[2]	Technical Feasibility[3]	Stakeholder Acceptance[4]	Permitting Reqments[5]	Overall Rating
A	Disposal in off-site landfill[6]	3	5	4	3	3	18
B	Stabilization in on-site parking area[6] (to be covered with asphalt)	2	4	4	3	4	17
C	Stabilization in on-site track or roadway area[6] (not covered)	2	4	3	2	5	16
D	Transport to Ashland's Canton Refinery for feed-stock[6]	3	2	1	3	3	12
E	Transport to asphalt plant for feed-stock[6]	4	2	3	3	3	15
F	Stabilization and use in conjunction with clay layers[6]	4	4	4	4	5	21

Notes:

1) Economic Impact = 1 for options ≥ \$50/tn and = 5 for options ≤ \$10/tn.
2) Scheduling Impact = 1 for options ≥ 8 months and = 5 for options ≤ 2 months.
3) Technical Feasibility = 1 for impractical / very difficult options and = 5 for easily implemented options.
4) Stakeholder Acceptance = 1 for options meeting substantial / insurmountable objections and = 5 for fully acceptable options.
5) Permitting Requirements = 1 for substantial / difficult requirements and = 5 for no permits required.
6) Options A-F include transport, placement and compaction of clean fill in Lagoon #1

TABLE 4

BUDGETARY COST ESTIMATES (+/- 15%)
CANTON DROP FORGE, INC.
RECONSTRUCTION OF LAGOON #1 AND BIOCELL DISPOSITION

Task Description	Recommended Option Cost Estimate[1]	Off-Site Landfill Option Cost Estimate[2]
Conduct detailed design and construction review	$15,000	$7,000
Pump out Lagoon #1	$1,000	$1,000
Remove oily soil from Lagoon #1 (600 cy)	$12,000	$12,000
Re-grade Lagoon #1	$2,000	$2,000
Place and compact clay lining in Lagoon #1 (400 cy)	$14,000	$14,000
Stabilize oily soil material in the biocell (3,600 cy)	$36,000	–
Place and compact stabilized soil in Lagoon #1 (4,300 cy)	$43,000	–
Place and compact final clay layer (200 cy)	$7,000	$7,000
General conditions	$9,000	$5,000
Test, load, haul and dispose oily soil offsite (3,600 cy)	–	$117,000
Place and compact clean fill in Lagoon #1 (2,400 cy)	--	$ 24,000
Range	118,000/160,000	160,000/217,000
TOTAL	**$139,000**	**$189,000**
	±15% 21,000	

Note: [1] Assumes that stabilized biocell material and clay liners, when compacted and placed, will provide sufficient capacity in Lagoon #1 for intended stormwater impoundment. Must be verified through survey (i.e., as part of general conditions).

[2] Assumes that biocell material can be disposed at American Landfill in Waynesburg without any pretreatment required (i.e., for stabilization, de-liquification, etc.).

RECOMMENDED OPTION

Conceptual Design

The conceptual design for the preferred option includes implementation of the following steps. Figure 2 provides a profile view of the resulting conceptual design. To implement this design, we recommend that CDF plan to:

- remove any residual oily soil which remains in Lagoon #1 and transfer it to the biocell;
- re-grade Lagoon #1, as necessary, to assure that the side-walls are stable;
- place and compact a 12-inch layer of clay, in two 6-inch lifts, to provide an impermeable lining in the Lagoon #1 excavation;
- in the biocell, add and mix 2% lime and 10% fly ash with the oily soil to stabilize it;
- transfer the stabilized mixture from the biocell to Lagoon #1;
- place and compact the stabilized biocell material in Lagoon #1; and
- place and compact one additional 6-inch layer of clay to cap and seal the surface of Lagoon #1.

Depending on the final size of Lagoon #1, excess stabilized biocell material may be available. Drainage and traffic considerations must be taken into account for the possible locations for on-site placement and compaction of this material. Appropriate consideration of these factors will preclude future erosion of this material from the property.

Budgetary Cost Estimate

Parsons ES has developed, working in conjunction with Beaver Excavating Company, a budgetary cost estimate (i.e., within +/- 15%) of $139,000 for the recommended option. This estimate is based on the assumptions that: $118,000/160,000

- about 3000 cubic yards of oily soil are available for stabilization in the biocell;
- about 600 cubic yards of additional oily soil must yet be removed from Lagoon #1;
- about 720 cubic yards of lime and flyash will be required to stabilize the biocell material; and
- about 600 cubic yards of clay will be required for the upper and lower layers lining the re-constructed Lagoon #1.

Table 4 contains the cost estimate, provided by major cost category. As an alternate, the base case of disposing of the biocell material in the American Landfill at Waynesburg (or alternatively at Central Waste in Alliance), with reconstruction of Lagoon #1 with virgin materials, is about $189,000.

Preliminary Schedule

It is projected that this recommended option, for re-constructing Lagoon #1 and addressing the disposition of the biocell material concurrently, can be accomplished within 9 to 10 weeks after CDF's issuance of an order to proceed. In particular, the final design for Lagoon #1 can be completed within 3-4 weeks. The construction phase of the project is anticipated to require about six (6) weeks.

anton

November 17, 1997

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TO: W. K. Cordier

FROM: J. P. Bressanelli

SUBJECT: Current Status Audit Action Plan

The following is the current status and forecasted costs to be incurred with the subject plan.

Lagoon 1:

Beaver began their work to restore *Lagoon 1*, but ~~their~~ work was temporarily suspended because the banks of the lagoon were too steep for good structural stability of the clay lining and treated biocell materials. The decision has now been made to use some additional remnant material from the biocell area, and some clean fill from an outside source, after treatment with lime and flyash for structural stability, to complete the project. Also, two catch basins near *Lagoon 1* are desirable to prevent erosion from surface waters and to better channel storm water to the lagoon. Finally, to also prevent erosion of the clay layer where storm water lines exit into the lagoon, Parsons is recommending rip raps under each pipe. Costs to be incurred for the project are as follows:

• Original Contract (no payment made as yet)		$219,600
• Net Prior Additions to the Project		2,000
• Incremental Cost for Decreasing Slope of the Lagoon		22,000
• Two Catch Basins with Lines to Lagoon 1		3,900
• Rip Rap Under Pipes		2,000
• Parson Project Supervision		6,000
• Bad Weather Contingencies	- Beaver	8,000
	- Parsons	1,500
TOTAL		**$265,000**

Parson's work will include supervision of the removal and treatment of the remnant biocell material, approval of ~~the~~ clean fill from an outside source and supervision of the installation of the fill materials and the clay lining in the remainder of the lagoon. The $9,500 contingencies relate to the possible disruption of construction work due to rain, snow, heavy freeze, etc. ~~in further delaying construction to once again begin~~. This $9,500 could be avoided by postponing further work until spring.

Lagoon 2:

According to Parsons, current *EPA* regulations require us to stop the discharge of oil bearing waste streams to lagoons, but do not require remediation of oil impacted soil around the lagoon banks. Therefore, I recommend that we do not remediate the oily soil on the banks of *Lagoon 2* at this time.

As part of the Audit Action Plan, we have been considering various means for eliminating oil from the condensate from our steam exhaust system (the main source of the oil discharge to *Lagoon 2*). A prototype separator tank has been installed, but most, if not all, of the oil is emulsified with the water. All methods proposed for eliminating the emulsified oil have been very complex and expensive.

At this point, we believe that the most cost effective way to deal with the oil in the effluent from the boiler house separator is to combine it with an oil-free process stream to dilute it to an acceptable level for potential discharge to the municipal sewer system.

Presently, we are discharging the stream from our hot process softener in the boiler house to the sewer system, with the authority's approval. However, recently the operator of the sewer system found lime deposits in the sewer and traced it back to CDF. We must eliminate lime carryover to the sewer system from the hot process softener or find a new place to discharge this stream.

Current thinking is, to eliminate the lime in the discharge from the hot process softener with a system proposed by *Diversey Water Technologies* and *U.S. Filter* and then combine this oil-free stream with the oil bearing stream from the boiler water separator, diluting the oil content to a level hopefully acceptable to the *Massillon Sewerage Authority*. *Massillon*'s approval of the volume and composition of the combined streams will be required. The estimated cost of the lime removal system is $75,000 to $90,000, with an additional $10,000 to $20,000 for hardware and plumbing to combine the two.

It now appears that completion of the Audit Action Plan is in sight, unless the *EPA* comes up with new rules or otherwise creates new compliance requirements. If we complete remediation of *Lagoon 1*, as outlined above, for $265,000 or less and merge the boiler house effluent with an oil-free stream from our hot process softener (after installing a needed lime removal system) at a cost of $110,000 or less, the total remaining Audit Action Plan costs should be below $375,000.

On September 30, there was still $96,000 left in the Escrow Account, which will be available to cover 60 percent of the next $160,000 of costs. Therefore, it looks like CDF's portion of the estimated $375,000 still to be spent will be $279,000. I estimate that the amount of that $375,000 to be spent before year-end will be $265,000, of which $__________ will come from Escrow and $__________ will come from CDF. The remaining balance, all payable by CDF should be spent before mid-year 1998.

JPB/mkb

Margie,

Please Fedex 1 copy of each of these to Mr. O'sullivan and Duncan Moss (see attached)

Thank You

Sean

plu conf #
Phda 71

track. #
798881251283

CDF006927

GODFREY KAHN S.C.

P. DUNCAN MOSS
ATTORNEY AT LAW
EMAIL • dmoss@gklaw.com
DIRECT • 608.284.2211
MOBILE • 608.215.0467

www • GKLAW.COM TEL • 608.257.3911 FAX • 608.257.0609
ONE EAST MAIN STREET, SUITE 500, POST OFFICE BOX 2719, MADISON, WI 53701-2719

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PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119

PARESCL/1097/Dee/EJK7-99

10 October 1997

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Proposal to Obtain Ohio EPA Approval for the Removal and Transfer of Depositional Material from Lagoon No. 2

Dear Keith:

Confirming our conversations by telephone during 6-8 October 1997 and in our on-site meeting on 7 October 1997, Parsons Engineering Science, Inc. (Parsons ES) is pleased to have this opportunity to present the above-referenced proposal (Proposal) to Canton Drop Forge, Inc. (CDF). It is our understanding that CDF is potentially interested in removing about 3,000 cubic yards of the top layer (i.e., with the highest water content) of depositional material from Lagoon No. 2, transferring this material into the containment area previously referred to as the "bio-cell" (cell) on CDF's property for natural de-watering through weathering, and ultimately, after stabilization and solidification, placing the material in Lagoon No. 1 prior to installation of the upper clay layer in that Lagoon. Prior to planning, designing and undertaking this effort, CDF is interested in obtaining an opinion from the Ohio Environmental Protection Agency (Ohio EPA) regarding the applicability of Voluntary Action Program (VAP) rules to this project.

REGULATORY BACKGROUND

Due to the total petroleum hydrocarbon (TPH) concentrations of the depositional material in Lagoon No. 2 and CDF's proposed plan to remove a portion of the material, stabilize and solidify it, and transfer the stabilized product to Lagoon No. 1, it appears that Ohio EPA may require that the proposed action be administered under the agency's Solid Waste Rules (promulgated under Ohio Revised Code 3734.02), not VAP. These rules are more restrictive (than VAP requirements) with respect to the options available for handling the Lagoon No. 2 depositional material. For example, solid waste rules may require that the material be disposed in an appropriate off-site landfill.

Ohio EPA has indicated that there are several requests for rulings on similar projects pending throughout the State at this time. The agency has suggested that an application for a 3734.02 (G) exemption be filed for Ohio EPA's review prior to initiating the proposed action. The process for obtaining an exemption from Ohio EPA is becoming more straight-forward, due to the agency's backlog and the number of determinations that the agency has made in several similar situations. In general, these determinations have been favorable for such actions that do not pose any significant threat to human health or the environment. In fact, the agency is considering amending its rules to provide state-wide coverage of this exemption in certain, specific situations (see listing in item B below); it may be a year or longer before this rule change occurs, however.

In the meantime, CDF has three possible options for addressing this issue:

A. depend on the foregoing information for making its own determination i.e., that CDF's proposed action should be approvable and that, if investigated, the agency would reach the same conclusion. Although this option has no immediate costs associated with it, there are significant risks that Ohio EPA may, at some future time, identify this issue and attempt to administer the property under its Solid Waste rules.

B. present to Ohio EPA as much site-specific and project-specific information as the agency deems appropriate, without disclosing the name, location or ownership of the property, for review and determination of VAP applicability. Based on several discussions with Ohio EPA's VAP staff, it appears that a determination can be obtained (indicating that an exemption is feasible) on the following basis:

   1. the material is impacted by only TPH concentrations above VAP generic standards; i.e., it does not exceed TCLP levels for RCRA waste characterization;
   2. Lagoon No. 2 is contiguous with or inter-connected to Lagoon No. 1; i.e., the proposed action will not result in the transfer of impacted material off-site or to a part of the property not previously and similarly impacted;
   3. the material will be stabilized and solidified for structural stability purposes; and
   4. the material, once stabilized, will be placed in a clay-lined and capped horizon; thus in the extremely unlikely event that the material is leachable, it would be prevented from migrating and thus impacting groundwater and the surrounding environment by the highly impermeable clay layers encapsulating it. Ultimately, simple modeling may be required to demonstrate that the material will not impact groundwater quality.

It is likely that a determination can be obtained based solely on the written material submitted to and reviewed by Ohio EPA, followed by a conference call to discuss same. There is a possibility, however, that Ohio EPA may require that a meeting be conducted to complete the review process. The submittal, conference call and meeting, if required, would be completed on a non-disclosure basis. The costs for these activities are described below. Although not specifically developed and available for CDF's use (in the non-binding, undisclosed case), Ohio EPA's written determination would be placed in the agency's files. Should the matter attract the agency's attention in the future, the file containing the determination could be retrieved.

C. present to Ohio EPA site- and project-specific information , including the disclosure of the name, location or ownership of the property, for review and determination of VAP applicability and to obtain the ORC 3734.02 (G) exemption. A review meeting with Ohio EPA, including legal representation for both parties, will likely result in the issuance of a project-specific exemption to CDF. The cost for this approach is probably in the order-of-magnitude of $10,000.

The most significant benefit of this incremental step is that a formal exemption would be issued directly to CDF by Ohio EPA, so there will be little risk that a future problem may arise regarding this matter. Two small, but not inescapable risks, which should be considered, are that Ohio EPA may identify additional issues, especially if the agency undertakes a site investigation in the determination process, and that the agency's files containing the exemption, once issued, would be available for Freedom of Information Act (FOIA) reviews by third parties. Due to the voluntary nature of the planned mitigation activities, it is extremely unlikely that Ohio EPA would pursue any enforcement action in such a case. In fact, VAP rules prevent the agency from initiating an enforcement action when the property owner can demonstrate that a voluntary action is in progress.

PROPOSED SCOPE OF WORK

The following tasks comprise our Proposed Scope of Work for this Project:

Task 1 - Review VAP Applicability with Ohio EPA

As indicated in our letter report presenting options for side slope construction in Lagoon No. 1, addressed to you and dated 25 September 1997, and described above as option B, we recommended that CDF authorize Parsons ES to discuss the process (of stabilizing and transferring Lagoon No. 2 depositional material into Lagoon No. 1) with Ohio EPA's Voluntary Action Program (VAP) staff. This discussion would be conducted on a non-binding and non-disclosure basis. It is proposed, to save time and money and if acceptable to Ohio EPA, that this review be conducted, after Ohio EPA's receipt of pertinent information regarding the process, as a conference call, rather than a face-to-face meeting (in Columbus). [Please note that our proposal includes a "level-of-effort" estimate for preparing and transmitting the required information to Ohio EPA; a more complete understanding of the submittal requirements (and the effort and costs associated with their compilation) will be had after the week of 13 October 1997, when the agency will be discussing this matter (on behalf of other petitioners). Also, if Ohio EPA should require that a meeting (instead of a conference call) be held, an additional cost of $1,106 would be incurred.]

As indicated above, the objective of the recommended discussion is to verify that Ohio EPA can administer the proposed actions under VAP, not RCRA (as if it were a land-filling operation), by determining that issuance of an exemption (under ORC 3734.02 (G)) is feasible. As suggested by CDF, we may also include Mr. Rick Zollinger, Esq., in the discussions, if appropriate. If so, a briefing note would be prepared for and forwarded to Mr. Zollinger, prior to the discussion.

Following this discussion with agency staff, Parsons ES will develop a letter report, incorporating information concerning Ohio EPA's written, non-binding determination, as a "confidential, attorney-client privileged communication". In addition to summarizing the results of the discussion with Ohio EPA, Parsons ES will describe incremental activities, if any (i.e., modeling), and their respective costs, which Ohio EPA may require for this project to be considered for completion under VAP guidance.

Task 2 - Project Administration

During the course of this activity, Parsons ES will provide project administrative support to CDF, including biweekly status reports of progress with respect to schedule and budget. In budgeting for this activity, Parsons ES has assumed that the duration of the project will not exceed eight (8) weeks (see below).

PROPOSED BUDGET AND SCHEDULE

Parsons ES proposes to complete the Proposed Scope of Work, as described above, on a "time and expenses, total not-to-exceed" basis, for a cost of not more than $4,108. If a meeting with Ohio EPA is required, in lieu of the conference call proposed in Task 1 above, an additional cost of $1,106 would be incurred. Also, since our proposal includes a "level-of-effort" estimate for preparing and transmitting the required information to Ohio EPA, the cost of this activity could be higher, depending on final agency requirements; a more complete understanding of the submittal requirements (and the effort and costs associated with their compilation) will be had after the week of 13 October 1997

These estimates assume that Ohio EPA will not charge expenses for review of our submittal, as has been the agency's practice for initial requests in other VAP projects; if Ohio EPA does require that a fee be paid for review services, information regarding the amount will be communicated with and approved by CDF prior to proceeding.

Using terms and conditions employed in other proposals for similar consulting services for CDF, Parsons ES' labor costs are based on direct labor rates times a multiplier of 2.95 and invoiced other direct costs (ODCs) marked-up by 10%. Please refer to Table 1 for a detailed break-down of the proposed budget.

Parsons ES anticipates an eight (8) week schedule for the implementation of this work, contingent on the turn-around time required by Ohio EPA, as follows:

1. Draft document preparation, for submittal to Ohio EPA for review on a non-disclosure basis, will be completed within two (2) weeks of receipt of authorization to proceed (RAP) from CDF;
2. Following review by CDF and Mr. Zollinger, Esq., during the subsequent week, we will complete any revisions to the documentation and submit same to Ohio EPA within another one (1) week; and
3. Assuming that Ohio EPA can review and make a determination within three (3) weeks of receipt (i.e., the Ohio EPA is currently experiencing a three- to four-week backlog for similar requests), we expect the agency's findings to be issued within another week, at which time our letter report can be completed and issued..

PROJECT PARTICIPANTS

The primary technical contributors, for the Tasks defined above, will include the following:

- Alan Resnik - discussions with Ohio EPA regarding applicability of VAP rules; and
- Ed Karkalik - project management.

Resumes of proposed project contributors have been provided previously.

TERMS AND CONDITIONS

The Terms and Conditions of Parsons ES' enclosed Engineering Services Agreement (ESA), with Supplemental Terms and Conditions attached, will apply to this work. Please sign the ESA in the place designated and return all copies to Parsons ES for counter-signature. We will forward an executed original copy for your files. We will also assume that our receipt of the ESA, signed by an appropriate representative of Canton Drop Forge, or a faxed version of same, and/or CDF's purchase order referencing same, will serve as your authorization to proceed.

Parsons ES is pleased to have this opportunity to continue providing environmental engineering services to Canton Drop Forge. If you require any additional information or clarification regarding this Proposal, please contact Ed Karkalik by telephone at (216) 486-9005 or by facsimile at (216) 486-6119.

Very truly yours,

PARSONS ENGINEERING SCIENCE, INC.

Wilson H. Rownd, PE
Vice President/Manager

Ed Karkalik

Edward J. Karkalik, PE
Project Manager

WHR/EJK/dee
cc: CMB (File 97290097003)
Mr. Alan Resnik, CP (Parsons ES)

Figure 1

CANTON DROP FORGE, INC.
Lagoon No. 2 VAP Applicability Determination

PROJECT COST ESTIMATE

CSTEST01

	ODCs									
	COMMUNICATIONS				TRAVEL	COMPUTER		PRINTING		MISC
	Teleph ($)	FAX ($)	Fed Ex ($)	Postage ($)	Mileage (mi.)	WP (hr)	CAD (hr)	Copier (ea)	Blue Prints (ea)	($)
TASK DESCRIPTION	1	1	1	1	0.31	10	15	0.10	1	1
1 A VAP Determination - Draft Documentation	10	10	10			6	3	100	5	
	$10	$10	$10	$0	$0	$60	$45	$10	$5	$0
B Review with CDF/Revise	10	5	10		70	3	1	100	5	
	$10	$5	$10	$0	$22	$30	$15	$10	$5	$0
C Develop Briefing Note for Zollinger	10	3	0			2		5		
	$10	$3	$0	$0	$0	$20	$0	$1	$0	$0
D Arrange/Conduct Conference Call	20	3	10			0.5	0	5		
	$20	$3	$10	$0	$0	$5	$0	$1	$0	$0
E Develop Letter Report	10			6		4		100	5	
	$10	$0	$0	$6	$0	$40	$0	$10	$5	$0
2 Project Administration	20	10				4		50		
	$20	$10	$0	$0	$0	$40	$0	$5	$0	$0
3 Meeting with Ohio EPA (Contingent)	20	5			330	0.5		50		
	$20	$5	$0	$0	$102	$5	$0	$5	$0	$0
Total Units	100	36	30	6	400	20	4	410	15	0
Total Costs	$100	$36	$30	$6	$124	$200	$60	$41	$15	$0

NOTES:

(1)

(2)

(3)

(4)

CDF006934

PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119
PARESCL/1097/Dcc/EJK7-99

10 October 1997

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Proposal to Obtain Ohio EPA Approval for the Removal and Transfer of Depositional Material from Lagoon No. 2

Dear Keith:

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REGULATORY BACKGROUND

Due to the total petroleum hydrocarbon (TPH) concentrations of the depositional material in Lagoon No. 2 and CDF's proposed plan to remove a portion of the material, stabilize and solidify it, and transfer the stabilized product to Lagoon No. 1, it appears that Ohio EPA may require that the proposed action be administered under the agency's Solid Waste Rules (promulgated under Ohio Revised Code 3734.02), not VAP. These rules are more restrictive (than VAP requirements) with respect to the options available for handling the Lagoon No. 2 depositional material. For example, solid waste rules may require that the material be disposed in an appropriate off-site landfill.

RULE TO ALLOW VAP

Ohio EPA has indicated that there are several requests for rulings on similar projects pending throughout the State at this time. The agency has suggested that an application for a 3734.02 (G) exemption be filed for Ohio EPA's review prior to initiating the proposed action. The process for obtaining an exemption from Ohio EPA is becoming more straight-forward, due to the agency's backlog and the number of determinations that the agency has made in several similar situations. In general, these determinations have been favorable for such actions that do not pose any significant threat to human health or the environment. In fact, the agency is considering amending its rules to provide state-wide coverage of this exemption in certain, specific situations (see listing in item B below); it may be a year or longer before this rule change occurs, however.

In the meantime, CDF has three possible options for addressing this issue:

A. depend on the foregoing information for making its own determination i.e., that CDF's proposed action should be approvable and that, if investigated, the agency would reach the same conclusion. Although this option has no immediate costs associated with it, there are significant risks that Ohio EPA may, at some future time, identify this issue and attempt to administer the property under its Solid Waste rules.

B. present to Ohio EPA as much site-specific and project-specific information as the agency deems appropriate, without disclosing the name, location or ownership of the property, for review and determination of VAP applicability. Based on several discussions with Ohio EPA's VAP staff, it appears that a determination can be obtained (indicating that an exemption is feasible) on the following basis:

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It is likely that a determination can be obtained based solely on the written material submitted to and reviewed by Ohio EPA, followed by a conference call to discuss same. There is a possibility, however, that Ohio EPA may require that a meeting be conducted to complete the review process. The submittal, conference call and meeting, if required, would be completed on a non-disclosure basis. The costs for these activities are described below. Although not specifically developed and available for CDF's use (in the non-binding, undisclosed case), Ohio EPA's written determination would be placed in the agency's files. Should the matter attract the agency's attention in the future, the file containing the determination could be retrieved. THE EPA COULD STILL TAKE ACTION AGAINST CDF.

C. present to Ohio EPA site- and project-specific information, including the disclosure of the name, location or ownership of the property, for review and determination of VAP applicability and to obtain the ORC 3734.02 (G) exemption. A review meeting with Ohio EPA, including legal representation for both parties, will likely result in the issuance of a project-specific exemption to CDF. The cost for this approach is probably in the order-of-magnitude of $10,000.

The most significant benefit of this incremental step is that a formal exemption would be issued directly to CDF by Ohio EPA, so there will be little risk that a future problem may arise regarding this matter. Two small, but not inescapable risks, which should be considered, are that Ohio EPA may identify additional issues, especially if the agency undertakes a site investigation in the determination process, and that the agency's files containing the exemption, once issued,

NEIGHBORS, PRIVATE CITIZENS

would be available for Freedom of Information Act (FOIA) reviews by third parties. Due to the voluntary nature of the planned mitigation activities, it is extremely unlikely that Ohio EPA would pursue any enforcement action in such a case. In fact, VAP rules prevent the agency from initiating an enforcement action when the property owner can demonstrate that a voluntary action is in progress.

PROPOSED SCOPE OF WORK

The following tasks comprise our Proposed Scope of Work for this Project:

Task 1 - Review VAP Applicability with Ohio EPA

As indicated in our letter report presenting options for side slope construction in Lagoon No. 1, addressed to you and dated 25 September 1997, and described above as option B, we recommended that CDF authorize Parsons ES to discuss the process (of stabilizing and transferring Lagoon No. 2 depositional material into Lagoon No. 1) with Ohio EPA's Voluntary Action Program (VAP) staff. This discussion would be conducted on a non-binding and non-disclosure basis. It is proposed, to save time and money and if acceptable to Ohio EPA, that this review be conducted, after Ohio EPA's receipt of pertinent information regarding the process, as a conference call, rather than a face-to-face meeting (in Columbus). [Please note that our proposal includes a "level-of-effort" estimate for preparing and transmitting the required information to Ohio EPA; a more complete understanding of the submittal requirements (and the effort and costs associated with their compilation) will be had after the week of 13 October 1997, when the agency will be discussing this matter (on behalf of other petitioners). Also, if Ohio EPA should require that a meeting (instead of a conference call) be held, an additional cost of $1,106 would be incurred.]

As indicated above, the objective of the recommended discussion is to verify that Ohio EPA can administer the proposed actions under VAP, not RCRA (as if it were a land-filling operation), by determining that issuance of an exemption (under ORC 3734.02 (G)) is feasible. As suggested by CDF, we may also include Mr. Rick Zollinger, Esq., in the discussions, if appropriate. If so, a briefing note would be prepared for and forwarded to Mr. Zollinger, prior to the discussion.

Following this discussion with agency staff, Parsons ES will develop a letter report, incorporating information concerning Ohio EPA's written, non-binding determination, as a "confidential, attorney-client privileged communication". In addition to summarizing the results of the discussion with Ohio EPA, Parsons ES will describe incremental activities, if any (i.e., modeling), and their respective costs, which Ohio EPA may require for this project to be considered for completion under VAP guidance.

Task 2 - Project Administration

During the course of this activity, Parsons ES will provide project administrative support to CDF, including biweekly status reports of progress with respect to schedule and budget. In budgeting for this activity, Parsons ES has assumed that the duration of the project will not exceed eight (8) weeks (see below).

PROPOSED BUDGET AND SCHEDULE

Parsons ES proposes to complete the Proposed Scope of Work, as described above, on a "time and expenses, total not-to-exceed" basis, for a cost of not more than $4,108. If a meeting with Ohio EPA is required, in lieu of the conference call proposed in Task 1 above, an additional cost of $1,106 would be incurred. Also, since our proposal includes a "level-of-effort" estimate for preparing and transmitting the required information to Ohio EPA, the cost of this activity could be higher, depending on final agency requirements; a more complete understanding of the submittal requirements (and the effort and costs associated with their compilation) will be had after the week of 13 October 1997

These estimates assume that Ohio EPA will not charge expenses for review of our submittal, as has been the agency's practice for initial requests in other VAP projects; if Ohio EPA does require that a fee be paid for review services, information regarding the amount will be communicated with and approved by CDF prior to proceeding.

Using terms and conditions employed in other proposals for similar consulting services for CDF, Parsons ES' labor costs are based on direct labor rates times a multiplier of 2.95 and invoiced other direct costs (ODCs) marked-up by 10%. Please refer to Table 1 for a detailed break-down of the proposed budget.

Parsons ES anticipates an eight (8) week schedule for the implementation of this work, contingent on the turn-around time required by Ohio EPA, as follows:

1. Draft document preparation, for submittal to Ohio EPA for review on a non-disclosure basis, will be completed within two (2) weeks of receipt of authorization to proceed (RAP) from CDF;
2. Following review by CDF and Mr. Zollinger, Esq., during the subsequent week, we will complete any revisions to the documentation and submit same to Ohio EPA within another one (1) week; and
3. Assuming that Ohio EPA can review and make a determination within three (3) weeks of receipt (i.e., the Ohio EPA is currently experiencing a three- to four-week backlog for similar requests), we expect the agency's findings to be issued within another week, at which time our letter report can be completed and issued..

PROJECT PARTICIPANTS

The primary technical contributors, for the Tasks defined above, will include the following:

- Alan Resnik - discussions with Ohio EPA regarding applicability of VAP rules; and
- Ed Karkalik - project management.

Resumes of proposed project contributors have been provided previously.

TERMS AND CONDITIONS

The Terms and Conditions of Parsons ES' enclosed Engineering Services Agreement (ESA), with Supplemental Terms and Conditions attached, will apply to this work. Please sign the ESA in the place designated and return all copies to Parsons ES for counter-signature. We will forward an executed original copy for your files. We will also assume that our receipt of the ESA, signed by an appropriate representative of Canton Drop Forge, or a faxed version of same, and/or CDF's purchase order referencing same, will serve as your authorization to proceed.

Parsons ES is pleased to have this opportunity to continue providing environmental engineering services to Canton Drop Forge. If you require any additional information or clarification regarding this Proposal, please contact Ed Karkalik by telephone at (216) 486-9005 or by facsimile at (216) 486-6119.

Very truly yours,

PARSONS ENGINEERING SCIENCE, INC.

Wilson H. Rownd, PE
Vice President/Manager

Ed Karkalik

Edward J. Karkalik, PE
Project Manager

WHR/EJK/dee
cc: CMB (File 97290097003)
Mr. Alan Resnik, CP (Parsons ES)

Figure 1

CANTON DROP FORGE, INC.
Lagoon No. 2 VAP Applicability Determination

PROJECT COST ESTIMATE

CSTESTOL

LABOR												ODCs	TOTAL
TASK DESCRIPTION	Billing Title Name Rate	PROJ MGR EJK $119	CERT PROF AJR $80	CADD OPER JDeA $64	WORD PROC DAC $47	SENIOR ENGR EJM $85	JUNIOR ENGR DAK $58	FIELD ENGR SSS $53	ADMIN MGR CMB $86	ASSOC ENGR I $0	Total Hours Total Cost	ODCs	Total Task Cost
1 A VAP Determination - Draft Documentation	hours	2	4	3	1	1	3	1	0.5		15.5		
	$	$237	$321	$192	$47	$85	$173	$53	$43	$0	$1,152	$150	$1,302
B Review with CDF/Revise	hours	2	1	1	0.5						4.5		
	$	$237	$80	$64	$24	$0	$0	$0	$0	$0	$405	$107	$512
C Develop Briefing Note for Zollinger	hours	1	2		0.5						3.5		
	$	$119	$160	$0	$24	$0	$0	$0	$0	$0	$302	$34	$336
D Arrange/Conduct Conference Call	hours	2	3		0.5				0		5.5		
	$	$237	$241	$0	$24	$0	$0	$0	$0	$0	$501	$39	$540
E Develop Letter Report	hours	2	2		1	1		1			7.0		
	$	$237	$160	$0	$47	$85	$0	$53	$0	$0	$582	$71	$653
2 Project Administration	hours	4	1		2				0.5		7.5		
	$	$474	$80	$0	$94	$0	$0	$0	$43	$0	$691	$75	$766
3 Meeting with Ohio EPA (Contingent)	hours	2	8		1				0.5		11.5		
	$	$237	$642	$0	$47	$0	$0	$0	$43	$0	$969	$137	$1,106
Total Units	Hours	15	21	4	6.5	2	3	2	1.5	0	55	PROJECT Totals	
Total Costs	Cost	$1,778	$1,684	$256	$306	$169	$173	$107	$129	$0	$4,602	$612	$5,214

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Figure 1

CANTON DROP FORGE, INC.

Lagoon No. 2 VAP Applicability Determination

PROJECT COST ESTIMATE

CSTEST01

TASK DESCRIPTION	ODCs: COMMUNICATIONS Teleph ($)	FAX ($)	Fed Ex ($)	Postage ($)	TRAVEL Mileage (mi.)	COMPUTER WP (hr)	CAD (hr)	PRINTING Copier (ea)	Blue Prints (ea)	MISC ($)
	1	1	1	1	0.31	10	15	0.10	1	1
1 A VAP Determination - Draft Documentation	10	10	10			6	3	100	5	
	$10	$10	$10	$0	$0	$60	$45	$10	$5	$0
B Review with CDF/Revise	10	5	10		70	3	1	100	5	
	$10	$5	$10	$0	$22	$30	$15	$10	$5	$0
C Develop Briefing Note for Zollinger	10	3	0			2		5		
	$10	$3	$0	$0	$0	$20	$0	$1	$0	$0
D Arrange/Conduct Conference Call	20	3	10			0.5	0	5		
	$20	$3	$10	$0	$0	$5	$0	$1	$0	$0
E Develop Letter Report	10			6		4		100	5	
	$10	$0	$0	$6	$0	$40	$0	$10	$5	$0
2 Project Administration	20	10				4		50		
	$20	$10	$0	$0	$0	$40	$0	$5	$0	$0
3 Meeting with Ohio EPA (Contingent)	20	5			330	0.5		50		
	$20	$5	$0	$0	$102	$5	$0	$5	$0	$0
Total Units	100	36	30	6	400	20	4	410	15	0
Total Costs	$100	$36	$30	$6	$124	$200	$60	$41	$15	$0

NOTES:
(1)
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PARSONS ENGINEERING SCIENCE COMPANIES

ENGINEERING SERVICES AGREEMENT

PARSONS ES: 19101 Villaview Road
Suite 301
Cleveland, OH 44119

AGREEMENT NO.

CLIENT'S ID. NO.

CLIENT: Canton Drop Forge Inc.
4575 Southway Street, SW
Canton, OH 44706

EFFECTIVE DATE	COMPLETION DATE	PARSONS ES' CONTACT	CLIENT'S CONTACT
13 October 1997	31 December 1997	Edward J. Karkalik ( )216-486-9005	Keith Houseknecht ( ) 330-477-4511

COMPENSATION

- ☐ STANDARD RATE SCHEDULE
- ☐ (Attachment A)
- ☒ PAYMENT SHALL NOT EXCEED $ 5,214.00
UNLESS AUTHORIZED IN WRITING BY CLIENT
- ☐ OTHER (as indicated below)
- ☐ LUMP SUM $
- ☐ INVOICE MONTHLY (INSTRUCTIONS BELOW)

ITEM	DESCRIPTION OF SERVICES/SPECIAL PROVISION
01	Provide Services in accordance with Scope and Terms and Conditions included in Proposal dated 10 October 1997.

PARSONS ES

Date 10.10.97

Wilson H. Rownd, P.E.
Vice President/Manager
PARSONS ENGINEERING SCIENCE, INC.
19101 Villaview Road, Suite 301
Cleveland, OH 44119

CLIENT CANTON DROP FORGE INC.

Date

J.P. Bressanelli
President

THE STANDARD TERMS AND CONDITIONS CONTAINED ON THE REVERSE SIDE HEREOF ARE APPLICABLE TO THIS AGREEMENT

PARSONS

REV 10/96

PARSONS ES ACCOUNTING

CDF006942

ADDENDUM A

SUPPLEMENTAL TERMS AND CONDITIONS

(Environmental Audit Report Agreements)

The following supplemental terms and conditions shall take precedence over any inconsistent term and conclusions in the AGREEMENT:

1. The information and conclusions presented in the report described In the Scope of Work (hereinafter called the Report) shall be valid only for the circumstances of the site(s) investigated as described in the Report (hereinafter called the Premises) as they existed during the time period of the investigation.

2. The Report shall not constitute a warranty, guaranty, or representation (1) of the absolute absence of hazardous or otherwise harmful substances or conditions on the Premises or (2) if such substances or conditions are found on the Premises, that the investigations accurately define the degree and extent of possible contamination of the Premises.

3. Parsons Engineering Science, Inc. (Parsons ES) shall evaluate the reasonableness and completeness of all relevant information, but Parsons ES shall assume no responsibility for the truth or accuracy of any information provided to Parsons ES by others or for the lack of information that is intentionally or negligently withheld from Parsons ES by others.

4. After termination of the AGREEMENT, if Parsons ES obtains information that it believes warrants further exploration and development, Parsons ES will endeavor to provide it to the CLIENT, but Parsons ES will not be liable for not doing so.

5. The Report shall be construed neither as a legal opinion nor as compliance with any environmental law, "innocent landowner defense", or "due diligence inquiry". Only legal counsel retained by CLIENT shall be competent to determine the legal implications of information or conclusions contained in the Report.

6. Except as expressly provided for in our agreement with our CLIENT, Parsons ES shall not be responsible for any effect upon CLIENT's or others' legal rights, obligations or liabilities or for any effect upon the financiability, marketability or value of the Premises or for the occurrence or nonoccurrence of any transaction involving the Premises based upon the information stated in the Report.

7. The Report shall contain the following or a substantially similar "Notice to Interested Parties":

   "To achieve the study objectives stated in this Report, we were required to base our conclusions on the best information available during the period of the investigation and within the limits by our CLIENT in the AGREEMENT.

   "No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information. Thus, we cannot guarantee that the investigations completely defined the degree or extent of any contamination by hazardous or otherwise harmful substances described in the Report or, if no such contamination was found, its absolute absence. Professional judgement was exercised in gathering and analyzing the information obtained, and we commit ourselves to the usual care, thoroughness, and competence of the engineering profession.

ADDENDUM A

"This report is not a legal opinion. It does not necessarily comply with requirements defined in any environmental law such as the "innocent landowner defense" or "due diligence inquiry". Only legal counsel retained by you is competent to determine the legal implications for you of any information or conclusions in this Report.

"Except as expressly provided for in our AGREEMENT with our CLIENT, Parsons ES is not responsible for any effect upon the legal rights, obligations, or liabilities of any party or for any effect on the financiability, marketability, or value of the property investigated in the study or for the occurrence or non-occurrence of any transaction involving the property."

8. If Parsons ES is made a party to any action instituted by CLIENT against a third party or by a third party against CLIENT arising out of or resulting from the occurrence or nonoccurrence of any transaction concerning any Premises subject to consultant's services hereunder, or otherwise, CLIENT shall at its cost and at Parsons ES option defend Parsons ES therefrom and further, except to the extent Parsons ES is found separately liable for its sole negligence or willful misconduct, indemnify and hold Parsons ES harmless from any judgment rendered in connection therewith and all cost and expenses (including reasonable; attorney's fees) incurred by Parsons ES in connection with such action.

   In addition, CLIENT shall reimburse Parsons ES costs, including but not limited to hourly fees for Parsons ES expert, technical or other testimony and related travel, preparation and copying costs, required of Parsons ES by CLIENT or other third parties in any action instituted by CLIENT or a third party involving Parsons ES services provided hereunder, but not involving Parsons ES as a party to such action. "Third Party" shall include governmental organizations as well as private parties.

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be credited to the hazardous waste facility management fund. Annual permit fees totaling forty thousand dollars or more for any one facility may be paid on a quarterly basis with the first quarterly payment each year being due on the anniversary of the date of issuance of the hazardous waste facility installation and operation permit and of any subsequent renewal permits. The annual permit fee shall be determined for each permit holder by the director in accordance with the following schedule:

TYPE OF BASIC MANAGEMENT UNIT	TYPE OF FACILITY	FEE
Storage facility using:		
Containers	On-site, off-site, and satellite	$ 500
Tanks	On-site, off-site, and satellite	500
Waste pile	On-site, off-site, and satellite	3,000
Surface impoundment	On-site and satellite	8,000
	Off-site	10,000
Disposal facility using:		
Deep well injection	On-site and satellite	15,000
	Off-site	25,000
Landfill	On-site and satellite	25,000
	Off-site	40,000
Land application	On-site and satellite	2,500
	Off-site	5,000
Surface impoundment	On-site and satellite	10,000
	Off-site	20,000
Treatment facility using:		
Tanks	On-site, off-site, and satellite	700
Surface impoundment	On-site and satellite	8,000
	Off-site	10,000
Incinerator	On-site and satellite	5,000
	Off-site	10,000†
Other forms of treatment	On-site, off-site, and satellite	1,000

In determining the annual permit fee required by this section, the director shall not require additional payments for multiple units of the same method of storage, treatment, or disposal or for individual units that are used for both storage and treatment. A facility using more than one method of storage, treatment, or disposal shall pay the permit fee indicated by the schedule for each such method.

The director shall not require the payment of that portion of an annual permit fee of any permit holder that would apply to a hazardous waste management unit for which a permit has been issued, but for which construction has not yet commenced. Once construction has commenced, the director shall require the payment of a part of the appropriate fee indicated by the schedule that bears the same relationship to the total fee that the number of days remaining until the next anniversary date at which payment of the annual permit fee is due bears to three hundred sixty-five.

The director, by rules adopted in accordance with Chapters 119. and 3745. of the Revised Code, shall prescribe procedures for collecting the annual permit fee established by this division and may prescribe other requirements necessary to carry out this division.

(3) The prohibition against establishing or operating a hazardous waste facility without a hazardous waste facility installation and operation permit from the board does not apply to either of the following:

(a) A facility that is operating in accordance with a permit renewal issued under division (H) of section 3734.05 of the Revised Code, a revision issued under division (I) of that section as it existed prior to the effective date of Sub. H.B. No. 435 of the 121st general assembly, or a modification issued by the director under division (I) of that section on and after that effective date;

(b) Except as provided in division (J) of section 3734.05 of the Revised Code, a facility that will operate or is operating in accordance with a permit by rule, or that is not subject to permit requirements, under rules adopted by the director. In accordance with Chapter 119. of the Revised Code, the director shall adopt, and subsequently may amend, suspend, or rescind, rules for the purposes of division (E)(3)(b) of this section. Any rules so adopted shall be consistent with and equivalent to regulations pertaining to interim status adopted under the "Resource Conservation and Recovery Act of 1976," 90 Stat. 2806, 42 U.S.C.A. 6921, as amended, except as otherwise provided in this chapter.

If a modification is requested or proposed for a facility described in division (E)(3)(a) or (b) of this section, division (I)(8) of section 3734.05 of the Revised Code applies.

(F) No person shall store, treat, or dispose of hazardous waste identified or listed under this chapter and rules adopted under it, regardless of whether generated on or off the premises where the waste is stored, treated, or disposed of, or transport or cause to be transported any hazardous waste identified or listed under this chapter and rules adopted under it to any other premises, except at or to any of the following:

(1) A hazardous waste facility operating under a permit issued in accordance with this chapter;

(2) A facility in another state operating under a license or permit issued in accordance with the "Resource Conservation and Recovery Act of 1976," 90 Stat. 2806, 42 U.S.C.A. 6921, as amended;

(3) A facility in another nation operating in accordance with the laws of that nation;

(4) A facility holding a permit issued pursuant to Title I of the "Marine Protection, Research, and Sanctuaries Act of 1972," 86 Stat. 1052, 33 U.S.C.A. 1401, as amended;

(5) A hazardous waste facility as described in division (E)(3)(a) or (b) of this section.

(G) The director, by order, may exempt any person generating, collecting, storing, treating, disposing of, or transporting solid wastes or hazardous waste, or processing solid wastes that consist of scrap tires, in such quantities or under such circumstances that, in the determination of the director, are unlikely to adversely affect the public health or safety or the environment from any requirement to obtain a registration certificate, permit, or license or comply with the manifest system or other requirements of this chapter. Such an exemption shall be consistent with and equivalent to any regulations adopted by the administrator of the United States environmental protection agency under the "Resource Conservation and Recovery Act of 1976," 90 Stat. 2806, 42 U.S.C.A. 6921, as amended, except as otherwise provided in this chapter.

(H) No person shall engage in filling, grading, excavating, building, drilling, or mining on land where a hazardous waste facility, or a solid waste facility, was operated without prior authorization from the director, who shall establish the procedure for granting such authorization by rules adopted in accordance with Chapter 119. of the Revised Code.

A public utility that has main or distribution lines above or below the land surface located on an easement or right-of-way across land where a solid waste facility was operated may engage in any such activity within the easement or right-of-way without prior authorization from the director for purposes of performing emergency repair or emergency replacement of its lines; of the poles, towers, foundations, or other structures supporting or sustaining any such lines; or of the appurtenances to those structures, necessary to restore or maintain existing public utility service. A public utility may enter upon any such easement or right-of-way without prior authorization from the director for purposes of performing necessary or routine maintenance of those portions of its existing lines; of the existing poles, towers, foundations, or other structures sustaining or supporting its lines; or of the appurtenances to any such supporting or sustaining structure, located on or above the land surface on any such easement or right-of-way. Within twenty-four hours after commencing any such emergency repair or replacement, or maintenance, work, the public utility shall notify the director or the director's authorized representative of those activities and shall provide such information regarding those activities as the director or the director's representative may request. Upon completion of the emergency repair or replacement, or maintenance, activities, the public utility shall restore any land of the solid waste facility disturbed by those activities to the condition existing prior to the commencement of those activities.

(I) No owner or operator of a hazardous waste facility, in the operation of the facility, shall cause, permit, or allow the emission therefrom of any particulate matter, dust, fumes, gas, mist, smoke, vapor, or odorous substance that, in the opinion of the director, unreasonably interferes with the comfortable enjoyment of life or property by persons living or working in the vicinity of the facility, or that is injurious to public health. Any such action is hereby declared to be a public nuisance.

(J) Notwithstanding any other provision of this chapter, in the event the director finds an imminent and substantial danger to public health or safety or the environment that creates an emergency situation requiring the immediate treatment, storage, or disposal of hazardous waste, the director may issue a temporary emergency permit to allow the treatment, storage, or disposal of the hazardous waste at a facility that is not otherwise authorized by a hazardous waste facility installation and operation permit to treat, store, or dispose of the waste. The emergency permit shall not exceed ninety days in duration and shall not be renewed. The director shall adopt, and may amend, suspend, or rescind, rules in accordance with Chapter 119. of the Revised Code governing the issuance, modification, revocation, and denial of emergency permits.

(K) No owner or operator of a sanitary landfill shall knowingly accept for disposal, or dispose of, any infectious wastes, other than those subject to division (A)(1)(c) of section 3734.021 [3734.02.1] of the Revised Code, that have not been treated to render them noninfectious. For the purposes of this division, certification by the owner or operator of the treatment facility where the wastes were treated on the shipping paper required by rules adopted under division (D)(2) of that section creates a rebuttable presumption that the wastes have been so treated.

(L) The director, in accordance with Chapter 119. of the Revised Code, shall adopt, and may amend, suspend, or rescind, rules having uniform application throughout the state establishing a training and certification program that shall be required for employees of boards of health who are responsible for enforcing the solid waste and infectious waste provisions of this chapter and rules adopted under them and for persons who are responsible for the operation of solid waste facilities or infectious waste treatment facilities. The rules shall provide all of the following, without limitation:

(1) The program shall be administered by the director and shall consist of a course on new solid waste and infectious waste technologies, enforcement procedures, and rules;

(2) The course shall be offered on an annual basis;

(3) Those persons who are required to take the course under division (L) of this section shall do so triennially;

(4) Persons who successfully complete the course shall be certified by the director;

(5) Certification shall be required for all employees of boards of health who are responsible for enforcing the solid waste or infectious waste provisions of this chapter and rules adopted under them and for all persons who are responsible for the operation of solid waste facilities or infectious waste treatment facilities;

(6)(a) All employees of a board of health who, on the effective date of the rules adopted under this division, are responsible for enforcing the solid waste or infectious waste provisions of this chapter and the rules adopted under them shall complete the course and be certified by the director not later than January 1, 1995;

(b) All employees of a board of health who, after the effective date of the rules adopted under division (L) of this section, become responsible for enforcing the solid waste or infectious waste provisions of this chapter

2(b)
3

PARSONS ENGINEERING SCIENCE, INC.

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

TO: Mr. Keith Housknecht
LOCATION: CDF
RAPIDFAX NO.: 330-477-2046
COPIES TO:

FROM: Ed Karkalik
LOCATION:
DATE: 10/10/97

TOTAL NUMBER OF PAGES 13 (including this cover letter)

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL BACK AS SOON AS POSSIBLE. TELEPHONE NUMBER (216) 486-9005.

PARSONS ENGINEERING SCIENCE, INC.
CLEVELAND, OH 44119 - RAPIDFAX (216) 486-6119

Keith -

At long last, our proposal. Please refer to Figure 1 for explanation of labor + expenses to get to total. We have minimized this to the best of our abilities.

I have sent copy to Rich Z. as well.

Ed

JOB NUMBER 972900.97003

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PARSONS ENGINEERING SCIENCE, INC.

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

DATE: 10/14/97

TO: Keith Houseknecht

LOCATION: CDF

RAPIDFAX NO.: 330-477-2046

COPIES TO:

FROM: Ed Karkalik

TOTAL NUMBER OF PAGES 3 (including this cover letter)

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL BACK AS SOON AS POSSIBLE.

We are herewith transmitting the following:

DATE	NO.	DESCRIPTION
10/10/97	EJK7-50	letter to Rick Zollinger

Dear Keith –

The attached had been sent to you – by snail-mail, so I'm faxing for your reference prior to our discussion this morning (Rick had asked for a briefing on what the issue(s) were about – I figured the best bet was to reference our proposal to you.

Ed

JOB NO. 731397.04000

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PARSONS ENGINEERING SCIENCE COMPANIES

ENGINEERING SERVICES AGREEMENT

2(b)
3

PARSONS ES: 19101 Villaview Road
Suite 301
Cleveland, OH 44119

AGREEMENT NO. ______

CLIENT'S ID. NO. ______

CLIENT: Canton Drop Forge Inc.
4575 Southway Street, SW
Canton, OH 44706

EFFECTIVE DATE	COMPLETION DATE	PARSONS ES' CONTACT	CLIENT'S CONTACT
13 October 1997	31 December 1997	Edward J. Karkalik ( )216-486-9005	Keith Houseknecht ( ) 330-477-4511

COMPENSATION

☐ STANDARD RATE SCHEDULE
☐ (Attachment A)
☒ PAYMENT SHALL NOT EXCEED $ 5,214.00
UNLESS AUTHORIZED IN WRITING BY CLIENT

☐ OTHER (as indicated below)
☐ LUMP SUM $______
☐ INVOICE MONTHLY (INSTRUCTIONS BELOW)

ITEM	DESCRIPTION OF SERVICES/SPECIAL PROVISION
01	Provide Services in accordance with Scope and Terms and Conditions included in Proposal dated 10 October 1997.

PARSONS ES

Date 10.10.97

Wilson H. Rownd, P.E.
Vice President/Manager
PARSONS ENGINEERING SCIENCE, INC.
19101 Villaview Road, Suite 301
Cleveland, OH 44119

CLIENT CANTON DROP FORGE INC.

Date ______

J.P. Bressanelli
President

THE STANDARD TERMS AND CONDITIONS CONTAINED ON THE REVERSE SIDE HEREOF ARE APPLICABLE TO THIS AGREEMENT

CDF006949

PARSONS

REV 10/96

PARSONS ES ACCOUNTING

PARSONS ENGINEERING SCIENCE COMPANIES

2(b)
3

ENGINEERING SERVICES AGREEMENT

PARSONS ES: 19101 Villaview Road
Suite 301
Cleveland, OH 44119

AGREEMENT NO.

CLIENT'S ID. NO.

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COMPENSATION

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☐ LUMP SUM $
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01	Provide Services in accordance with Scope and Terms and Conditions included in Proposal dated 10 October 1997.

PARSONS ES

Date 10.10.97

Wilson H. Rownd, P.EE
Vice President/Manager
PARSONS ENGINEERING SCIENCE, INC.
19101 Villaview Road, Suitew3001
Cleveland, OH 44119

CLIENT CANTON DROP FORGE INC.

Date

J.P. Bressanelli
President

THE STANDARD TERMS AND CONDITIONS CONTAINED ON THE REVERSE SIDE HEREOF ARE APPLICABLE TO THIS AGREEMENT

CDF006950

PARSONS

REV 10/96

CLIENT

PARSONS ENGINEERING SCIENCE COMPANIES

ENGINEERING SERVICES AGREEMENT

PARSONS ES: 19101 Villaview Road
Suite 301
Cleveland, OH 44119

AGREEMENT NO. ______________________

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COMPENSATION

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☐ OTHER (as indicated below)
☐ LUMP SUM $__________
☐ INVOICE MONTHLY (INSTRUCTIONS BELOW)

ITEM	DESCRIPTION OF SERVICES/SPECIAL PROVISION
01	Provide Services in accordance with Scope and Terms and Conditions included in Proposal dated 10 October 1997.

PARSONS ES

Date 10.10.97

Wilson H. Rownd, P.E.
Vice President/Manager
PARSONS ENGINEERING SCIENCE, INC.
19101 Villaview Road, Suite 301
Cleveland, OH 44119

CLIENT CANTON DROP FORGE INC.

Date ______

J.P. Bressanelli
President

THE STANDARD TERMS AND CONDITIONS CONTAINED ON THE REVERSE SIDE HEREOF ARE APPLICABLE TO THIS AGREEMENT

CDF006951

PARSONS

REV 10/96

PARSONS ENGINEERING SCIENCE COMPANIES

ENGINEERING SERVICES AGREEMENT

PARSONS ES: 19101 Villaview Road
Suite 301
Cleveland, OH 44119

AGREEMENT NO.

CLIENT'S ID. NO.

CLIENT: Canton Drop Forge Inc.
4575 Southway Street, SW
Canton, OH 44706

EFFECTIVE DATE	COMPLETION DATE	PARSONS ES' CONTACT	CLIENT'S CONTACT
13 October 1997	31 December 1997	Edward J. Karkalik ( )216-486-9005	Keith Houseknecht ( ) 330-477-4511

COMPENSATION

☐ STANDARD RATE SCHEDULE
☐ (Attachment A)
☒ PAYMENT SHALL NOT EXCEED $ 5,214.00
UNLESS AUTHORIZED IN WRITING BY CLIENT

☐ OTHER (as indicated below)
☐ LUMP SUM $
☐ INVOICE MONTHLY (INSTRUCTIONS BELOW)

ITEM	DESCRIPTION OF SERVICES/SPECIAL PROVISION
01	Provide Services in accordance with Scope and Terms and Conditions included in Proposal dated 10 October 1997.

PARSONS ES

Date 10.15.97

Wilson H. Rowad, P.E.
Vice President/Manager
PARSONS ENGINEERING SCIENCE, INC.
19101 Villaview Road, Suite 301
Cleveland, OH 44119

CLIENT CANTON DROP FORGE INC.

Date

J.P. Bressanelli
President

THE STANDARD TERMS AND CONDITIONS CONTAINED ON THE REVERSE SIDE HEREOF ARE APPLICABLE TO THIS AGREEMENT

CDF006952

PARSONS

REV 10/96

PARSONS ES PROJECT MANAGER

ADDENDUM A

SUPPLEMENTAL TERMS AND CONDITIONS

(Environmental Audit Report Agreements)

The following supplemental terms and conditions shall take precedence over any inconsistent term and conclusions in the AGREEMENT:

1. The information and conclusions presented in the report described In the Scope of Work (hereinafter called the Report) shall be valid only for the circumstances of the site(s) investigated as described in the Report (hereinafter called the Premises) as they existed during the time period of the investigation.

2. The Report shall not constitute a warranty, guaranty, or representation (1) of the absolute absence of hazardous or otherwise harmful substances or conditions on the Premises or (2) if such substances or conditions are found on the Premises, that the investigations accurately define the degree and extent of possible contamination of the Premises.

3. Parsons Engineering Science, Inc. (Parsons ES) shall evaluate the reasonableness and completeness of all relevant information, but Parsons ES shall assume no responsibility for the truth or accuracy of any information provided to Parsons ES by others or for the lack of information that is intentionally or negligently withheld from Parsons ES by others.

4. After termination of the AGREEMENT, if Parsons ES obtains information that it believes warrants further exploration and development, Parsons ES will endeavor to provide it to the CLIENT, but Parsons ES will not be liable for not doing so.

5. The Report shall be construed neither as a legal opinion nor as compliance with any environmental law, "innocent landowner defense", or "due diligence inquiry". Only legal counsel retained by CLIENT shall be competent to determine the legal implications of information or conclusions contained in the Report.

6. Except as expressly provided for in our agreement with our CLIENT, Parsons ES shall not be responsible for any effect upon CLIENT's or others' legal rights, obligations or liabilities or for any effect upon the financiability, marketability or value of the Premises or for the occurrence or nonoccurrence of any transaction involving the Premises based upon the information stated in the Report.

7. The Report shall contain the following or a substantially similar "Notice to Interested Parties":

   "To achieve the study objectives stated in this Report, we were required to base our conclusions on the best information available during the period of the investigation and within the limits by our CLIENT in the AGREEMENT.

   "No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information. Thus, we cannot guarantee that the investigations completely defined the degree or extent of any contamination by hazardous or otherwise harmful substances described in the Report or, if no such contamination was found, its absolute absence. Professional judgement was exercised in gathering and analyzing the information obtained, and we commit ourselves to the usual care, thoroughness, and competence of the engineering profession.

"This report is not a legal opinion. It does not necessarily comply with requirements defined in any environmental law such as the "innocent landowner defense" or "due diligence inquiry". Only legal counsel retained by you is competent to determine the legal implications for you of any information or conclusions in this Report.

"Except as expressly provided for in our AGREEMENT with our CLIENT, Parsons ES is not responsible for any effect upon the legal rights, obligations, or liabilities of any party or for any effect on the financiability, marketability, or value of the property investigated in the study or for the occurrence or non-occurrence of any transaction involving the property."

8. If Parsons ES is made a party to any action instituted by CLIENT against a third party or by a third party against CLIENT arising out of or resulting from the occurrence or nonoccurrence of any transaction concerning any Premises subject to consultant's services hereunder, or otherwise, CLIENT shall at its cost and at Parsons ES option defend Parsons ES therefrom and further, except to the extent Parsons ES is found separately liable for its sole negligence or willful misconduct, indemnify and hold Parsons ES harmless from any judgment rendered in connection therewith and all cost and expenses (including reasonable; attorney's fees) incurred by Parsons ES in connection with such action.

   In addition, CLIENT shall reimburse Parsons ES costs, including but not limited to hourly fees for Parsons ES expert, technical or other testimony and related travel, preparation and copying costs, required of Parsons ES by CLIENT or other third parties in any action instituted by CLIENT or a third party involving Parsons ES services provided hereunder, but not involving Parsons ES as a party to such action. "Third Party" shall include governmental organizations as well as private parties.

be credited to the hazardous waste facility management fund. Annual permit fees totaling forty thousand dollars or more for any one facility may be paid on a quarterly basis with the first quarterly payment each year being due on the anniversary of the date of issuance of the hazardous waste facility installation and operation permit and of any subsequent renewal permits. The annual permit fee shall be determined for each permit holder by the director in accordance with the following schedule:

TYPE OF BASIC MANAGEMENT UNIT	TYPE OF FACILITY	FEE
Storage facility using:		
Containers	On-site, off-site, and satellite	$ 500
Tanks	On-site, off-site, and satellite	500
Waste pile	On-site, off-site, and satellite	3,000
Surface impoundment	On-site and satellite	8,000
	Off-site	10,000
Disposal facility using:		
Deep well injection	On-site and satellite	15,000
	Off-site	25,000
Landfill	On-site and satellite	25,000
	Off-site	40,000
Land application	On-site and satellite	2,500
	Off-site	5,000
Surface impoundment	On-site and satellite	10,000
	Off-site	20,000
Treatment facility using:		
Tanks	On-site, off-site, and satellite	700
Surface impoundment	On-site and satellite	8,000
	Off-site	10,000
Incinerator	On-site and satellite	5,000
	Off-site	10,000†
Other forms of treatment	On-site, off-site, and satellite	1,000

In determining the annual permit fee required by this section, the director shall not require additional payments for multiple units of the same method of storage, treatment, or disposal or for individual units that are used for both storage and treatment. A facility using more than one method of storage, treatment, or disposal shall pay the permit fee indicated by the schedule for each such method.

The director shall not require the payment of that portion of an annual permit fee of any permit holder that would apply to a hazardous waste management unit for which a permit has been issued, but for which construction has not yet commenced. Once construction has commenced, the director shall require the payment of a part of the appropriate fee indicated by the schedule that bears the same relationship to the total fee that the number of days remaining until the next anniversary date at which payment of the annual permit fee is due bears to three hundred sixty-five.

The director, by rules adopted in accordance with Chapters 119. and 3745. of the Revised Code, shall prescribe procedures for collecting the annual permit fee established by this division and may prescribe other requirements necessary to carry out this division.

(3) The prohibition against establishing or operating a hazardous waste facility without a hazardous waste facility installation and operation permit from the board does not apply to either of the following:

(a) A facility that is operating in accordance with a permit renewal issued under division (H) of section 3734.05 of the Revised Code, a revision issued under division (I) of that section as it existed prior to the effective date of Sub. H.B. No. 435 of the 121st general assembly, or a modification issued by the director under division (I) of that section on and after that effective date;

(b) Except as provided in division (J) of section 3734.05 of the Revised Code, a facility that will operate or is operating in accordance with a permit by rule, or that is not subject to permit requirements, under rules adopted by the director. In accordance with Chapter 119. of the Revised Code, the director shall adopt, and subsequently may amend, suspend, or rescind, rules for the purposes of division (E)(3)(b) of this section. Any rules so adopted shall be consistent with and equivalent to regulations pertaining to interim status adopted under the "Resource Conservation and Recovery Act of 1976," 90 Stat. 2806, 42 U.S.C.A. 6921, as amended, except as otherwise provided in this chapter.

If a modification is requested or proposed for a facility described in division (E)(3)(a) or (b) of this section, division (I)(8) of section 3734.05 of the Revised Code applies.

(F) No person shall store, treat, or dispose of hazardous waste identified or listed under this chapter and rules adopted under it, regardless of whether generated on or off the premises where the waste is stored, treated, or disposed of, or transport or cause to be transported any hazardous waste identified or listed under this chapter and rules adopted under it to any other premises, except at or to any of the following:

(1) A hazardous waste facility operating under a permit issued in accordance with this chapter;

(2) A facility in another state operating under a license or permit issued in accordance with the "Resource Conservation and Recovery Act of 1976," 90 Stat. 2806, 42 U.S.C.A. 6921, as amended;

(3) A facility in another nation operating in accordance with the laws of that nation;

(4) A facility holding a permit issued pursuant to Title I of the "Marine Protection, Research, and Sanctuaries Act of 1972," 86 Stat. 1052, 33 U.S.C.A. 1401, as amended;

(5) A hazardous waste facility as described in division (E)(3)(a) or (b) of this section.

(G) The director, by order, may exempt any person generating, collecting, storing, treating, disposing of, or transporting solid wastes or hazardous waste, or processing solid wastes that consist of scrap tires, in such quantities or under such circumstances that, in the determination of the director, are unlikely to adversely affect the public health or safety or the environment from any requirement to obtain a registration certificate, permit, or license or comply with the manifest system or other requirements of this chapter. Such an exemption shall be consistent with and equivalent to any regulations adopted by the administrator of the United States environmental protection agency under the "Resource Conservation and Recovery Act of 1976," 90 Stat. 2806, 42 U.S.C.A. 6921, as amended, except as otherwise provided in this chapter.

(H) No person shall engage in filling, grading, excavating, building, drilling, or mining on land where a hazardous waste facility, or a solid waste facility, was operated without prior authorization from the director, who shall establish the procedure for granting such authorization by rules adopted in accordance with Chapter 119. of the Revised Code.

A public utility that has main or distribution lines above or below the land surface located on an easement or right-of-way across land where a solid waste facility was operated may engage in any such activity within the easement or right-of-way without prior authorization from the director for purposes of performing emergency repair or emergency replacement of its lines; of the poles, towers, foundations, or other structures supporting or sustaining any such lines; or of the appurtenances to those structures, necessary to restore or maintain existing public utility service. A public utility may enter upon any such easement or right-of-way without prior authorization from the director for purposes of performing necessary or routine maintenance of those portions of its existing lines; of the existing poles, towers, foundations, or other structures sustaining or supporting its lines; or of the appurtenances to any such supporting or sustaining structure, located on or above the land surface on any such easement or right-of-way. Within twenty-four hours after commencing any such emergency repair or replacement, or maintenance, work, the public utility shall notify the director or the director's authorized representative of those activities and shall provide such information regarding those activities as the director or the director's representative may request. Upon completion of the emergency repair or replacement, or maintenance, activities, the public utility shall restore any land of the solid waste facility disturbed by those activities to the condition existing prior to the commencement of those activities.

(I) No owner or operator of a hazardous waste facility, in the operation of the facility, shall cause, permit, or allow the emission therefrom of any particulate matter, dust, fumes, gas, mist, smoke, vapor, or odorous substance that, in the opinion of the director, unreasonably interferes with the comfortable enjoyment of life or property by persons living or working in the vicinity of the facility, or that is injurious to public health. Any such action is hereby declared to be a public nuisance.

(J) Notwithstanding any other provision of this chapter, in the event the director finds an imminent and substantial danger to public health or safety or the environment that creates an emergency situation requiring the immediate treatment, storage, or disposal of hazardous waste, the director may issue a temporary emergency permit to allow the treatment, storage, or disposal of the hazardous waste at a facility that is not otherwise authorized by a hazardous waste facility installation and operation permit to treat, store, or dispose of the waste. The emergency permit shall not exceed ninety days in duration and shall not be renewed. The director shall adopt, and may amend, suspend, or rescind, rules in accordance with Chapter 119. of the Revised Code governing the issuance, modification, revocation, and denial of emergency permits.

(K) No owner or operator of a sanitary landfill shall knowingly accept for disposal, or dispose of, any infectious wastes, other than those subject to division (A)(1)(c) of section 3734.021 [3734.02.1] of the Revised Code, that have not been treated to render them noninfectious. For the purposes of this division, certification by the owner or operator of the treatment facility where the wastes were treated on the shipping paper required by rules adopted under division (D)(2) of that section creates a rebuttable presumption that the wastes have been so treated.

(L) The director, in accordance with Chapter 119. of the Revised Code, shall adopt, and may amend, suspend, or rescind, rules having uniform application throughout the state establishing a training and certification program that shall be required for employees of boards of health who are responsible for enforcing the solid waste and infectious waste provisions of this chapter and rules adopted under them and for persons who are responsible for the operation of solid waste facilities or infectious waste treatment facilities. The rules shall provide all of the following, without limitation:

(1) The program shall be administered by the director and shall consist of a course on new solid waste and infectious waste technologies, enforcement procedures, and rules;

(2) The course shall be offered on an annual basis;

(3) Those persons who are required to take the course under division (L) of this section shall do so triennially;

(4) Persons who successfully complete the course shall be certified by the director;

(5) Certification shall be required for all employees of boards of health who are responsible for enforcing the solid waste or infectious waste provisions of this chapter and rules adopted under them and for all persons who are responsible for the operation of solid waste facilities or infectious waste treatment facilities;

(6)(a) All employees of a board of health who, on the effective date of the rules adopted under this division, are responsible for enforcing the solid waste or infectious waste provisions of this chapter and the rules adopted under them shall complete the course and be certified by the director not later than January 1, 1995;

(b) All employees of a board of health who, after the effective date of the rules adopted under division (L) of this section, become responsible for enforcing the solid waste or infectious waste provisions of this chapter

2(b)
3

PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119
PARESCL/1097/Dea/EJK7-46

15 October 1997

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Proposal to Develop Bid Package and Construction Contracting Documents for the Removal Of Depositional Material from Lagoon No. 2

Dear Keith:

Confirming our telephone conversations during the week of 6 October 1997 and our discussions during Mr. Wilson Rownd's and my visit on 7 October 1997, Parsons Engineering Science, Inc. (Parsons ES) is pleased to have this opportunity to present the above-referenced proposal (Proposal) to Canton Drop Forge, Inc. (CDF). It is our understanding that CDF is interested in removing about 3,000 cubic yards of the most fluid portion of depositional material from Lagoon No. 2 and transferring this material into the holding area previously referred to as the "bio-cell" (cell) on CDF's property (the Project). The objectives of the proposed Project are:

A. to remove the free floating oil (to be collected and discharged into the oil recovery tank), free water (to be discharged to Lagoon No. 3), and depositional material (to be transferred to the cell) from Lagoon No. 2 to prepare the material for stabilization and solidification;

B. to promote the "pre-treatment" of the subject material through the application of natural de-watering and other natural weathering processes, which reduce the overall moisture content of the material; and

C. to provide additional space in Lagoon No. 2 for the subsequent (during 1998) stabilization and solidification of remaining material in place (i.e., in the bottom of the Lagoon).

NOT NECESSARILY CAN WE LEAVE IT

PROPOSED SCOPE OF WORK

The following tasks comprise our Proposed Scope of Work for this Project:

Task 1 - Develop Bid Documents

Pending the outcome of discussions with Ohio EPA (the subject of a proposal previously submitted - on 10 October 1997 - to you) and commencing with the results of the environmental, geotechnical and treatability testing analyses previously generated and reported for the depositional material in Lagoon No. 2, Parsons ES will develop a design package for the proposed work. In particular, Parsons ES will develop general and technical specifications for the Project. Also, we will develop a general plot plan, showing the location of the Project elements, and a conceptual process drawing for the proposed work. Consideration of the following alternate

Post-It™ brand fax transmittal memo 7671	# of pages ▸ 10
To Keith Houseknecht	From Ed Karkalik
Co. CDF	Co.
Dept.	Phone #
Fax # 330 477-2046	Fax #

PARSONS

means, among others, for the removal and transfer of depositional material from Lagoon No. 2, will be undertaken:

- bucket and/or drag-line removal, operated from a crane, with direct transfer to the cell;
- bucket and/or drag-line removal, with transfer to dump trucks for hauling to the cell;
- dredging, with pumping directly to the cell; and
- turbo-vacuum pump removal, with pumping directly to the cell

Guidance for Health & Safety Plan (HASP), work scheduling and cost control document preparation, by the selected contractor, will also be provided.

Task 2 - Solicit/Review Bids

Parsons ES will identify up to five (5) prospective, pre-qualified construction contractors, the names of which will be reviewed with and approved by CDF, for receipt of the proposed bid documentation. Parsons ES will solicit, on CDF's behalf, bids from the identified contractors. In the course of doing so, we will conduct a pre-bid review meeting at the CDF property with the prospective contractors.

Once bids have been received for CDF, Parsons ES will review the submittals and recommend a selection to CDF for award.

Task 3 - Support Contract Negotiations

Pending CDF's approval of the selected contractor, Parsons ES will support CDF in the negotiation of contract documents with the identified entity. Based on the conclusion of these discussions, Parsons ES will prepare, on CDF's behalf, final contract documents. A Parsons ES representative will attend one meeting at CDF for contract negotiations. We will forward to CDF the completed documentation for CDF's execution of a contract with the successful contractor.

Task 3A - Provide Alternate Contracting Support

Confirming our discussions during our visit on 7 October 1997, Parsons ES offers to CDF an alternate means for securing a contract for the required construction services. In particular, in **lieu of Tasks 1 through 3 above**, Parsons ES proposes that CDF consider selecting one contractor (i.e., The Beaver Excavating Company), providing a less defined package on which Beaver would be required to bid, and then negotiating a contract with Beaver. This approach has the potential advantages of being less costly administratively and possibly faster and easier than soliciting bids from several contractors. As discussed with you on 7 October 1997, this approach also has two potential disadvantages: (1) CDF would benefit only from the construction methodologies in which Beaver is experienced (i.e., excavate and transport via conventional methods) and (2) Beaver may not be the least expensive (on a unit cost basis) contractor to be considered for the proposed work.

Task 4 - Provide Construction Observation Services

Parsons ES will initiate the construction phase of the Project with a pre-construction conference on CDF's property. The intent of the meeting will be to confirm the scope, specifications and schedule of the proposed work, to establish lines of authority and communications, and to ensure that HASP, security and work plan procedures are mutually understood among the CDF, Parsons ES, and selected contractor's representatives.

Parsons ES will then assist CDF in the construction phase of the Project by providing on-site construction observation during critical phases of the work. In particular, Parsons ES will observe

1. the removal and transfer of free oil and water, to the appropriate destinations, respectively;
2. removal and transfer of the initial quantities of depositional material into the cell; and
3. witnessing of the final pass or cut of material to be removed from Lagoon No. 2.

To verify that the appropriate amounts of the material have been removed, Parsons ES will sub-contract, on CDF's behalf, the physical surveying of the dimensions and volume of the cell and Lagoon No. 2 during the following two occasions - once each (1) before commencement of and (2) subsequent to the completion of the removal and transfer of the depositional material. Parsons ES will monitor the placement of the material in the cell to ensure that weathering, as planned, can occur.

Task 5 - Project Administration

Prior to the commencement of the construction phase of the Project, Parsons ES will work with CDF and the selected contractor to develop a mutually acceptable project schedule, project plan and HASP for the execution of the work. The overall objective of the project plan is to ensure that work methods and procedures planned by the selected contractor comply with CDF's expectations and the specifications contained in the bid documents. The project plan will be developed in outline or bullet format and, hence, is not intended to be overly long or complex.

During the course of the project, Parsons ES will provide project administrative support to CDF, including biweekly status meetings and reporting of progress with respect to schedule and budget. In budgeting for this activity, Parsons ES has assumed that the duration of the project will not exceed seven (7) weeks (see below).

PROPOSED BUDGET AND SCHEDULE

Parsons ES proposes to complete the Proposed Scope of Work, as described above, on a "time and expenses, total not-to-exceed" basis, for a cost of not more than $7,000. If CDF prefers to use the alternate contracting approach (Task 3A), in lieu of the traditional approach (described in Tasks 1 through 3), Parsons ES costs would not exceed $4,991.

Using terms and conditions identical to those employed in our proposal for similar services for Lagoon No. 1, dated 13 June 1997, Parsons ES' labor costs will be based on direct labor rates times a multiplier of 2.80 and invoiced other direct costs (ODCs) marked-up by 7%. In that the primary construction contract will be issued by CDF directly to the selected vendor, costs for construction services are not reflected in this total. Please refer to Figure 1 for a detailed break-down of the proposed budget.

Parsons ES anticipates a seven (7) week schedule for the implementation of this work, as follows:

1. Bid document preparation, including conducting a pre-bid meeting, will be completed within two (2) weeks of receipt of authorization to proceed (RAP) from CDF;
2. Pending receipt of bids (acceptable to CDF) from the solicited contractors, we anticipate that the contract selection, award and negotiations will be completed within another two (2) weeks; and
3. Assuming that one of the criteria for contractor selection will be responsiveness, i.e., ability of the contractor to mobilize within several days, we expect the work to be completed within an additional three (3) weeks.
4. The relocation of overhead power lines, in the area between the cell and Lagoon No. 2, will be completed by CDF prior to the award of this work (and, hence, will not impact the overall schedule). Also, prior to commencement of work, it has been assumed that CDF will remove as much separate-phase oil and water from the Lagoon as reasonably feasible.

PROJECT TEAM

The primary technical contributors, for the Tasks defined above, will include the following:

- Gordon Melle - oversight for engineering, bid solicitation and review, and contracting;
- Beth McCartney - bid package development;
- Sam Saad - construction observation;
- Alan Resnik - applicability of VAP rules;
- Jocelyn DeAngelis - drafting/CADD; and
- Ed Karkalik - project management.

Resumes of proposed project contributors are available, upon request, if desired.

PARSONS ENGINEERING SCIENCE, INC.

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
15 October 1997
Page 5- Dce/EJK7-46

TERMS AND CONDITIONS

The terms and conditions of Parsons ES' enclosed Engineering Services Agreement (ESA), with Supplemental Terms and Conditions attached, will apply to this work. Please sign the ESA in the place designated and return all copies to Parsons ES for counter-signature. We will forward an executed original copy for your files. We will also assume that our receipt of the ESA, signed by an appropriate representative of Canton Drop Forge, or a faxed version of same, and/or CDF's purchase order referencing same, will serve as your authorization to proceed. As indicated previously, these Terms and Conditions are similar to those for the project underway for Lagoon No. 1 (based on our proposal dated 13 June 1997).

Parsons ES is pleased to have this opportunity to continue providing environmental engineering services to Canton Drop Forge. If you require any additional information or clarification regarding this Proposal, please contact Ed Karkalik by telephone at (216) 486-9005 or by facsimile at (216) 486-6119.

Very truly yours,

PARSONS ENGINEERING SCIENCE, INC.

Wilson H. Rownd, PE
Vice President

Ed Karkalik

Edward J. Karkalik, PE
Project Manager

WHR/EJK/dcc
cc: CMB (File 97290097003)
Mr. Gordon Melle, PE
Mr. Raymond Banary
Mr. Sam Saad
Ms. Elizabeth McCartney, PE

Figure 1

CANTON DROP FORGE, INC.
LAGOON NO. 2 DEPOSITIONAL MATERIAL REMOVAL

PROJECT COST ESTIMATE

C3TEST01

		LABOR											ODCs	TOTAL
TASK DESCRIPTION	Billing Title Category / Rate	PROJ MGR EJK	PRIN ENGR GJM	SENIOR ENGR EJM	JUNIOR ENGR LAB	CADD OPER JDeA	CERT PROF AJR	ADMIN MGR CMB	WORD PROC DAC	FIELD ENGR SSS	ASSOC ENGR	Total Hours / Total Cost	ODCs	Total Task Cost
	Rate	$112	$112	$81	$63	$61	$76	$82	$45	$51				
1 Develop Bid Documents	hours	4	1	2	4	8	2	1	2	1		25		
	$	$448	$112	$162	$252	$488	$152	$82	$90	$51	$0	$1,837	$245	$2,082
2 Solicit/Review Bids	hours	6	1		2				1	1		11		
	$	$672	$112	$0	$126	$0	$0	$0	$45	$51	$0	$1,006	$223	$1,229
3 Support Contract Negotiations	hours	6	1	1	4			1	2			15		
	$	$672	$112	$81	$252	$0	$0	$82	$90	$0	$0	$1,289	$168	$1,457
4 Provide Construction Observation Services	hours	4		1						16		21		
	$	$448	$0	$81	$0	$0	$0	$0	$0	$816	$0	$1,345	$174	$1,519
5 Project Administration	hours	4						1	2			7		
	$	$448	$0	$0	$0	$0	$0	$82	$90	$0	$0	$620	$93	$713
	hours											0		
	$	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3A Provide Alternate Contracting Support (in lieu of Tasks 1, 2 and 3 above)	hours	8	2	2	6	6	2	1	3	1		31		
	$	$896	$224	$162	$378	$366	$152	$82	$135	$51	$0	$2,446	$313	$2,759
	hours											0		
	$	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Units - Base Case	Hours	24	3	4	10	8	2	3	7	18	0	79	PROJECT Totals	
Total Costs - Base Case	Cost	$2,688	$336	$324	$630	$488	$152	$246	$315	$918	$0	$6,097	$903	$7,000
Total Units - Alternate Contracting	Hours	16	2	3	6	6	2	2	5	17	0	59	PROJECT Totals	
Total Costs - Alternate Contracting	Cost	$1,792	$224	$243	$378	$366	$152	$164	$225	$867	$0	$4,411	$580	$4,991

NOTES:

(1) Costs for surveying are not included here; instead, it is assumed that the selected contractor will conduct the surveying and include costs in price to CDF.

2(D)
3

PARSONS ENGINEERING SCIENCE COMPANIES

ENGINEERING SERVICES AGREEMENT

PARSONS ES: 19101 Villaview Road
Suite 301
Cleveland, OH 44119

AGREEMENT NO.

CLIENT'S ID. NO.

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☒ INVOICE MONTHLY (INSTRUCTIONS BELOW)

ITEM	DESCRIPTION OF SERVICES/SPECIAL PROVISION
01	Engineering Services, as described in Parsons ES' Proposal dated 15 October 1997 for the removal of depositional material from Lagoon No. 2 at Canton Drop Forge, Inc. Labor will be billed at direct labor rates times a 2.80 multiplier; other direct costs (ODCs), which are invoiced to Parsons ES, will be marked-up by 7%. All scheduled ODCs will be charged in accordance with the rates included in our 13 June 1997 proposal. Supplementary Terms and Conditions, indicated as Appendix A (attached), also apply.

PARSONS ES

Date 10.15.97

Wilson H. Rownd, P.E.
Vice President/Manager
PARSONS ENGINEERING SCIENCE, INC.
19101 Villaview Road, Suite 301
Cleveland, OH 44119

CLIENT CANTON DROP FORGE, INC.

Date

J.P. Bressanelli
President

THE STANDARD TERMS AND CONDITIONS CONTAINED ON THE REVERSE SIDE HEREOF ARE APPLICABLE TO THIS AGREEMENT

PARSONS

REV 10/96

PARSONS ES ACCOUNTING

STANDARD TERMS AND CONDITIONS

1. INTERPRETATION

This AGREEMENT, consisting of these standard terms and conditions and the terms/instructions typed on the face of this AGREEMENT together with the Exhibits attached hereto, and all documents, drawings, specifications and instruments specifically referred to herein and made a part hereof shall constitute the entire AGREEMENT between the parties, and no other proposals, conversations, bids, memoranda, or other matter shall vary, alter, or interpret the terms hereof. The captions on this AGREEMENT are for the convenience of the parties in identification of the several provisions and shall not constitute a part of this AGREEMENT nor be considered interpretative thereof.

Failure of either party to exercise any option, right or privilege under this AGREEMENT or to demand compliance as to any obligation or covenant of the other party shall not constitute a waiver of any such right, privilege or option, or of the performance thereof, unless waiver is expressly required in such event or is evidenced by a properly executed instrument.

2. SEVERABILITY

It is understood and agreed by the parties hereto that if any part, term, or provision with this AGREEMENT is held illegal or in conflict with any law of the State where made or having jurisdiction over any of the parties hereto, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the AGREEMENT did not contain the particular part, term, or provisions held to be invalid, unless the effect thereof would materially change the economic burden of or benefit to either party.

3. GOVERNING LAW

This AGREEMENT and the Attachments hereto shall be governed by and construed in accordance with the laws of the State in which the work is performed.

4. INDEPENDENT CONTRACTOR

In the performance of the services under this AGREEMENT, PARSONS ES shall be an independent contractor, maintaining complete control of PARSONS ES' personnel and operations. As such, PARSONS ES shall pay all salaries, wages, expenses, social security taxes, federal and state unemployment taxes and any similar taxes relating to the performance of this AGREEMENT. PARSONS ES, its employees and agents shall in no way be regarded nor shall they act as agents or employees of the CLIENT.

5. CHANGES

The CLIENT, through its authorized representative, without invalidating this AGREEMENT, may order changes within the general scope of the services required by this Agreement by altering, adding to and/or deducting from the services to be performed. If any changes under this clause causes an increase or decrease in PARSONS ES' cost of, or the time required for, the performance of any part of the work under this AGREEMENT, an equitable adjustment shall be made by mutual agreement and the AGREEMENT modified in writing accordingly. All such changes in the Services shall be in writing and shall be performed subject to the provisions of this AGREEMENT.

6. STOP WORK ORDER

CLIENT may at any time, by written notice to PARSONS ES, require PARSONS ES to stop all or any part of the work called for by this order for a period of up to ninety (90) days after the notice is delivered to PARSONS ES ("Stop Work Order"). Upon receipt of the Stop Work Order, PARSONS ES shall forthwith comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Within a period of ninety (90) days after a Stop Work Order is delivered to PARSONS ES, or within any extension of that period to which the parties have agreed, CLIENT shall either cancel the Stop Work Order, or terminate the work covered by this order as provided in the "Termination" paragraphs of this AGREEMENT. PARSONS ES shall resume work upon cancellation or expiration, of any Stop Work Order. An equitable adjustment shall be made in the delivery schedule of prices hereunder, or both, and this AGREEMENT shall be modified in writing accordingly, if the Stop Work Order results in an increase in the time required for the performance of this order or in PARSONS ES' costs properly allocable thereto. PARSONS ES may stop work, at its sole option if CLIENT fails to make payment of PARSONS ES invoices within 30 days of receipt as required by Article 17 below.

7. TERMINATION

A. The CLIENT may terminate this AGREEMENT in the whole or in part at any time by written notice to PARSONS ES. Such termination shall be effective in the manner specified in the said notice, shall be without prejudice to any claims which the CLIENT may have against PARSONS ES and shall be subject to the other provisions of this AGREEMENT. On receipt of such notice PARSONS ES shall, except as and to the extent directed, immediately discontinue the services and the placing of subcontractor orders for materials, facilities and supplies in connection with the performance of the services, and shall, if requested, make every reasonable effort to procedure termination of existing subcontracts upon terms satisfactory to the CLIENT. Thereafter, PARSONS ES shall do only such work as may be necessary to preserve and protect the services already in progress and to dispose of any property as requested by the CLIENT.

B. A complete settlement of all claims of PARSONS ES upon termination of the AGREEMENT, as provided in the preceding paragraph, shall be made as follows: (A) the CLIENT shall assume and become liable for all obligations and commitments that PARSONS ES may have in good faith undertaken or incurred in connection with the services which have not been included in prior payments (B) the CLIENT shall compensate PARSONS ES for the reasonable cost of terminating existing subcontracts and preserving, protecting or disposing of the CLIENT's property and performing any other necessary services after the notice of termination has been received (C) the CLIENT shall pay PARSONS ES for a Services performed, prior to date of termination, in accordance with this AGREEMENT. Prior to final settlement, PARSONS ES shall deliver to the CLIENT all Documents and all other required information and data prepared by PARSONS ES under this AGREEMENT and execute and deliver all documents, and take such other steps as are necessary, to vest fully in the CLIENT the rights and benefits of PARSONS ES arising from subcontracts issued in connection with this AGREEMENT, unless otherwise requested by the CLIENT in writing.

8. WARRANTY

PARSONS ES warrants that the services to be rendered pursuant to this AGREEMENT shall be performed in accordance with the standards customarily provided by an experienced and competent professional engineering organization rendering the same or similar services.

9. INDEMNITY

PARSONS ES shall indemnify, defend and hold the CLIENT harmless from and against claims, liabilities, suits, loss, cost, expense and damages arising from any negligent act or omission of PARSONS ES in the performance of work and service pursuant to this AGREEMENT. PARSONS ES' liability for all of the aforesaid matters is limited to the proceeds recovered from the insurance carried by PARSONS ES and within the monetary limits of the insurance specified in Article 13 hereto after settling claims of third parties.

10. FORCE MAJEURE

The respective duties and obligations of the parties hereunder (except the CLIENT's obligation to pay PARSON ES such sums as may become due from time to time for services rendered by it) shall be suspended while and so long as performance thereto is prevented or impeded by strikes, disturbances, riots, fire, severe weather, governmental action, war acts, acts of God, acts of the CLIENT, or any other cause similar or dissimilar to the foregoing which are beyond the reasonable control of the party from whom the affected performance was due.

11. ASSIGNMENTS

All obligations and covenants herein contained shall be intended to be binding upon the successors and assigns of PARSONS ES and the CLIENT. PARSONS ES shall not assign this AGREEMENT without the prior written consent of the CLIENT, which consent shall not be unreasonably withheld.

12. CONSEQUENTIAL DAMAGES

In no event shall PARSONS ES or its subcontractors or vendors of any tier be liable in contract, tort, strict liability, warranty, or otherwise for any special, indirect, incidental or consequential damages, such as but not limited to, loss of product, loss of use of the equipment or system, loss of anticipated profits or revenue, non-operation or increased expense of operation of other equipment of systems, cost of capital, or cost of purchased or replacement equipment or systems.

13. INSURANCE

PARSONS ES shall place and maintain with responsible insurance carriers the following insurance. At CLIENT's request, PARSONS ES shall deliver to CLIENT certificates of insurance which shall provide thirty days notice to be given to CLIENT in event of a cancellation.

A. Workers' Compensation and Employer's Liability Insurance

- Workers Compensation in compliance with the applicable state and federal laws
- Employer's Liability Limit $1,000,000

B. Comprehensive General Liability Insurance including Blanket Contractual, XCU* Hazards, Broad Form Property Damage, Completed Operations and Independent Contractor's Liability all applicable to Personal Injury, Bodily Injury and Property Damage to a combined single limit of $1,000,000 each occurrence subject to $2,000,000 annual aggregate for Completed Operations and Personal Injury other than Bodily Injury.

*Explosion, Collapse and Underground

C. Comprehensive Automobile Liability Insurance including owned, hired and nonowned automobiles, Bodily Injury and Property Damage to a combined single limit of $1,000,000 each occurrence.

D. Architects & Engineers Professional Liability Insurance affording, professional, liability, if any, to a combined single limit of $1,000,000 each occurrence/claim, subject to $2,000,000 annual aggregate.

14. ACCEPTANCE BY CLIENT

The WORK shall be deemed accepted by CLIENT unless, within fifteen (15) days after receipt of PARSONS ES' written notification of final completion, CLIENT will have given PARSONS ES written notice specifying in detail wherein the WORK is deficient, whereupon PARSONS ES will promptly proceed to make necessary corrections and, upon completion, the WORK shall be deemed accepted by CLIENT.

15. CLIENT FURNISHED DATA, DRAWINGS, AND SPECIFICATIONS

PARSONS ES shall have no liability for defects in the WORK attributable to PARSONS ES' reliance upon or use of data, design criteria, drawings, specifications or other information furnished by CLIENT and CLIENT agrees to indemnify and hold PARSONS ES harmless from any and all claims and judgments, and all losses, costs and expenses arising therefrom. PARSONS ES shall disclose to CLIENT, prior to use thereof, defects or omissions in the data, design criteria, drawings, specifications or other information furnished by CLIENT to PARSONS ES that PARSONS ES may reasonably discover in its review and inspection thereof.

16. REUSE OF DOCUMENTS

All documents including drawings and specifications prepared by PARSONS ES pursuant to this AGREEMENT are instruments of its services in respect of the PROJECT. They are not intended or represented to be suitable for reuse by CLIENT or others on extension of the PROJECT or on any other project. Any reuse without specific written verification or adaptation by PARSONS ES will be at CLIENT's sole risk and without liability or legal exposure to PARSONS ES, and CLIENT shall indemnify and hold harmless PARSONS ES from all claims, damages, losses and expenses including attorney's fees arising out of or resulting therefrom. Any such verification or adaptation will entitle PARSONS ES to further compensation at rates to be agreed upon by CLIENT and PARSONS ES.

17. INVOICING AND PAYMENT

Invoices are due and payable within 30 days after receipt. Interest at the rate of 1½% per month or the maximum rate allowable under the usury laws of the state in which the work is performed, whichever is lower, is due on all payments not paid on or before the 45th day after the invoice date. Interest shall be computed from the date of the invoice. In the event legal proceedings are necessary to collect payments not paid when due, CLIENT shall pay, in addition to such payments, PARSONS ES' reasonable attorney's fees and legal costs associated therewith.

In addition, PARSONS ES may, after giving seven days written notice to CLIENT, suspend services under this AGREEMENT until PARSONS ES has been paid in full all amounts due for services, expenses and charges. The contract value shall be increased accordingly by the amount of PARSONS ES' reasonable costs of shut down, delay and start up, which shall be effected by Change Order in accordance with Article 5. above.

If CLIENT disputes any portion of a request for payment, CLIENT shall pay the undisputed portion of such request as provided herein and shall promptly notify PARSONS ES of the amount in dispute and the reason therefor. Any portion of the disputed amount which is ultimately agreed upon by CLIENT and PARSONS ES, to be owed to PARSONS ES, shall accrue interest at the rate and commencing upon the date stipulated in this Article.

Unless otherwise specified on the face page of this AGREEMENT, invoices will not require support documentation.

18. AUDIT

PARSONS ES shall maintain records and accounts on a generally recognized accounting basis to support all charges billed to CLIENT. said records shall be available for inspection by CLIENT or his authorized representative at mutually convenient times. However, there will be no financial audit of any lump sum amount, PARSONS ES' fixed rates or unit rates or fixed percentages.

19. EQUAL EMPLOYMENT OPPORTUNITY

The Non-Discrimination clause contained in Section 202, Executive Order 11246, as amended, relating to Equal Employment Opportunity for all persons without regard to race, color, religion, sex, or national origin and the implementing rules and regulation prescribed by the Secretary of Labor (41 CFR, Chapter 60, 41 CFR 60-250 and 41 CFR 60-741) are incorporated herein.

20. ORDER OF PRECEDENCE

Any inconsistency or conflict between the standard terms and conditions set forth herein and those typed on the face of this AGREEMENT or any attachment thereof shall be resolved by giving precedence in the following order. First, typed instructions and/or conditions on the face of this AGREEMENT; Second, the Standard Terms and Conditions; and Third, the attachment(s) (if any) attached hereto.

CHANGES IN THESE TERMS AND CONDITIONS ARE NOT BINDING ON PARSONS ES UNLESS THEY ARE IN WRITING AND SIGNED BY AN AUTHORIZED REPRESENTATIVE OF PARSONS ES.

Appendix A

Supplemental Terms and Conditions

Dispute Resolution Provisions

Notwithstanding anything to the contrary elsewhere in this Agreement or Contract, in the event of a dispute between the parties arising out of or related to this Agreement or Contract, the parties shall use the following procedure as a condition precedent to either party pursuing other available remedies:

1. A party who believes a dispute exists (the "Disputing Party") shall put such dispute in writing to the other party (the "Responding Party"). Such writing shall clearly, though as briefly as practicable, state the substance and scope of the dispute, the Disputing Party's position relative thereto, including legal and factual justifications therefor, the remedy sought, and any other pertinent matters.

2. The Responding Party who receives such a writing shall respond in writing to the Disputing Party within ten business days. Such writing shall clearly, though as briefly as practicable, state the Responding Party's response to each of the items included in the Disputing Party's writing, and any other pertinent matters.

3. A meeting shall be held within ten business days attended by representatives of the parties having decision-making authority regarding the dispute, to attempt in good faith to negotiate a resolution of the dispute.

4. If, within ten business days after such meeting, the parties have not succeeded in negotiating a resolution of the dispute, the parties' representatives shall submit the dispute to one of their senior-level executives (including Presidents, Executive Vice Presidents, Senior Vice Presidents, and Chief Financial Officers) for review. A meeting shall be held within ten business days after such submission attended by such senior-level executives of the parties and any necessary representatives to attempt in good faith to negotiate a resolution of the dispute.

5. If, within ten business days after such meeting, the parties have not succeeded in negotiating a resolution of the dispute, the parties shall jointly appoint a mutually acceptable neutral person (the "Neutral"), or if they have been unable to agree upon such appointment within ten business days, then the American Arbitration Association by default, or other mutually agreed-upon organization, shall appoint such Neutral upon the application of either party. The fees of, and authorized costs incurred by, the Neutral shall be shared equally by the parties.

6. In consultation with the Neutral, the parties shall select or devise an alternative dispute resolution procedure (ADR) by which they will attempt to resolve the dispute, and a time and place for the ADR to be held, with the Neutral making the decision as to any such matters, if the parties have been unable to agree thereon within ten business days after initial consultation with the Neutral.

7. The parties agree to participate in good faith in the ADR for a minimum period of ten business days from the commencement of the ADR procedure. If the parties are not successful in resolving the dispute through the ADR, and the amount in dispute does not exceed $250,000.00, then the dispute shall be settled by arbitration in accordance with the Commercial Arbitration Rules of the American Arbitration Association, and judgment upon the award rendered by the arbitrator(s) may be entered in any court having jurisdiction. If the amount in dispute exceeds $250,000.00, then the parties may agree to submit the matter to binding arbitration, or either party may pursue other available remedies upon ten business days written notice to the other party specifying its intended course of action.

8. The parties may mutually agree in writing to extend any of the time periods stated herein. If a party fails to act within the time period specified herein, as mutually extended, such failure shall constitute waiver by such party of such condition, and the other party may proceed immediately to the next remedial step.

9. The parties agree that the ADR is a compromise negotiation for purposes of the federal and state rules of evidence. The entire procedure will be confidential. All conduct, statements, promises, offers, views and opinions, whether oral or written, made in the course of the ADR by any of the parties, their agents, employees, representatives or other invitees to the ADR and by the Neutral, who is the parties' joint agent for purposes of these compromise negotiations, are confidential and shall, in addition and where appropriate, be deemed to be work product and privileged. Such conduct, statements, promises, offers, views and opinions shall not be discoverable or admissible for any purposes, including impeachment, in any litigation or other proceeding involving the parties and shall not be disclosed to anyone not an agent, employee, expert, witness, or representative for any of the parties. Evidence otherwise discoverable or admissible is not excluded from discovery or admission as a result of its use in the ADR.

G:\RICK\ADRRFORM

PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119

Copy ... 10/8/97

PARESCL/1097/Dee/EJK7-45

7 October 1997

2 (b) 3

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Cash Flow Requirements for Canton Drop Forge Environmental Projects

Dear Keith:

Listed below, and described in detail on the subsequent sheets, are projected cash flow requirements for the environmental work underway or anticipated to be initiated at Canton Drop Forge within the next 6 - 12 months. Please note that this listing and the accompanying projections are not all-inclusive; the projections include only the items identified. If there are additional work contemplated by CDF, of which Parsons Engineering Science, Inc. (Parsons ES) is not aware, it has not been included here.

Item/Description	**Original Estimate**	**Completed By 10/3/97**[a]	**Projected By Y/E '97**[b]	**Deferred To 1998**
Beaver Excavating (Lagoon #1 re-constr'n)	$219,610	$171,478	$29,215	$21,592
Argo Technologies (Pump purchase)	5,4400	5,440	0	0
Parsons ES (Engineering services)	79,820	67,139	11,140	2,500
Additional engineering services	33,000[c]	0	6,000	27,000[c]
Additional construction services	375,000[c]	0	55,000	320,000[c]
TOTALS	$712,870	$238,617	$110,000	$370,000

Notes:

[a] includes estimates for work completed by 10/3/97; invoicing may be delayed by several weeks.
[b] includes estimates for work projected to be completed between 10/3/97 and 12/31/97; invoicing may be delayed into early 1998, however.
[c] represents the lower (base) end of the estimating range for these services, depending on scope, etc.

The estimates provided herein are based on the terms and scopes of work already contracted or otherwise being undertaken under obligation (i.e., PO), where such exists. For work planned but not yet initiated, costs estimates are based only a best guess, not a well-defined scope and cost projection. This caveat also applies to extension and expansions of work already underway but for which quotations from vendors are still outstanding.

If you need additional information regarding these projections, please call me at (216) 486-9005. Parsons ES looks forward to continuing to provide environmental management services to Canton Drop Forge.

Most sincerely.

PARSONS ENGINEERING SCIENCE, INC.

Ed Karkalik

Edward J. Karkalik, PE
Project Manager

EJK/dee
cc: File 73139703000

PARSONS ENGINEERING SCIENCE, INC.

Client ______ Job No. ______ Sheet ___ of ___

Subject ______ By ______ Date ______

Checked ______ Rev. ______

Estimated Status for Lagoon #1 Work
(Based on Beaver's Bid Form*)

Item #/Description	Original Contract Amt	Complete by 10/3	Projected 1997	Deferred 1998
1 Insurance	0	0	0	0
2 Perf Bond	$2,200	$2,170	0	$300
3 Mob/Demob	18,635	18,635	0	4,000
4 Demo/Site Prep	5,715	5,715	0	0
5 Excav/Backfill Foundations	1,082	0	$800	500
6 Sewer Lines	26,823	21,100	4,897	3,800
7 Pavement replace	2,739	2,739	0	0
8 Concrete Foundations	2,714	0	1500	1,500
9. Oil-Impacted Soil Removal	38,925	30,915 b	0	0
10 Soil Stabilization	32,060	32,060 b	0	0
11 Clay Layers	45,968	22,984	11,492	11,492
12 Stab Soil Placement	35,160	35,160 b	0	0
13 Equip Install.	946	0	946	0
14 Grading/Seeding	0	0	0	0
15 Electrical	5,873	0	8810 a	0
16 Start-up	770	0	770	0
TOTALS	$219,610	$171,478	$29,215	$21,592

Pump Purchase (By CDF directly)

1. Pump	$4,000	0	$4,000	0
2. Controls	1,440	0	1,440	0
	$5,440	0	$5,440	0

CDF006968

* as revised based on amendments + discussion w/ Beaver + CDF

a incremental costs due to changed conditions

PARSONS ENGINEERING SCIENCE, INC.

Client ______________________ Job No. ______________________ Sheet ____ of ____

Subject ______________________ By ______________________ Date ______________________

______________________ Checked ______________________ Rev. ______________________

Explanation of "extras" for Lagoon #1 contract

Item 2 - need to buy perf bond for 1998 work (1% of $30,000) this is beyond scope already agreed due to slip in schedule.

Item 3 - re-mobilize in Spring '98 with bulldozer, sheep's foot and vibratory rollers, backhoe w/ hoepack ram and bucket

Item 5 - excavate + backfill 3 pipe support foundations in Spring '98

Item 6 - incremental cost to install temporary couplers on 6 lines ($210 + $210 inst) plus flexible piping on 6 lines ($250 + $200 inst) plus flexible piping on pump suction (25 × 10 + 250 ins) added to contracted work to be done yet (extending permanent line to pump at edge of Lagoon ($1264), pump bypass installation ($913) and sewer closures (350)) during 1997. In 1998, permanent extensions to be completed ($486 × 6 - $420) = plus rest of forced main extension into lagoon

Item 8 - install 3 sonotube foundations in Spring '98 for pipe supports

Item 9 - estimated removal/stabilization was for about 450 (not 600) cubic yards - reducing costs by $8,010 (ex

Item 11 - assumes purchase and stockpiling of remaining (about 50%) of clay at side of Lagoon #1

Item 15 - assumes an increase in distance of about 50% to pick up power in SW corner of Forge shop, in lieu of old conduit at edge of Lagoon #1, offsets cost of Beaver installing control panel and disconnect.

TOTALS - represents an increment of $2,675, with offsetting reductions ($8,010) and extras ($10,675).

CDF006969

PARSONS ENGINEERING SCIENCE, INC.

Client ______ Job No. ______ Sheet ___ of ___

Subject ______ By ______ Date ______

Checked ______ Rev. ______

Parsons ES engineering/Const. observation costs

(based on CDF PO# 98072, 98252, 98575, 98576, 98622, 98623, + 98867)

Item # / Description	Original Contract Amt	Complete by 10/3	Projected 1997	Deferred 1998
98072 / Biocell Study	17,909	17,049	500	0
98252 / Condensate Sampling	7,000	6,693	200	0
98575 / Lagoon #1 Design/Const	29,794 [a]	26,220	2,500	2,500
98576 / Lagoon #2 Sampling	14,317	6,377	7,940	0
98622 / Lagoon #2 Bypass Predesign	2,600	2,600	0	0
98623 / Condensate Testing	6,600	6,600	0	0
98867 / Lagoon #1 Sewers	1,600	1,600	0	0
TOTALS	$79,820	$67,139	$11,140	$2,50

Additional Engineering Services Projected

(based on "guestimate" of work to be scoped/costed)

	Estimate	Complete by 10/3	Projected 1997	Deferred 1998
— / Lagoon #2 sludge removal bid pack / contract neg. / const. observation	$6,000	0	$6,000	0
— / Lagoon #2 design / bid pack / contract neg. / const. observation	$25,000	0	0	$25,00
— / Lagoon #2 Bypass design / bid pack / contract neg. / const. observ.	$2,000 to 5,000	0	0	$2,000 5,00
	$33,000 to 36,000	0	$6,000	$27,00 30,00

a includes recently approved amendment.

b anticipates $1500 add'l supplement required due to schedule extension (1998 resulting in total extra for less than $1,000.

PARSONS ENGINEERING SCIENCE, INC.

Client ______ Job No. ______ Sheet ___ of ___

Subject ______ By ______ Date ______

Checked ______ Rev. ______

Additional Construction Services Remaining
(Based on "guestimates" of work to be scoped/costed/bid)

Item / Description	Estimate	Complete by 10/3	Projected 1997	Deferred 1998
— / Lagoon #2 sludge removal (first 2000 yd^3)	\$50,000 to 80,000 [a]	0	\$50,000 to 80,000	0
— / Lagoon #2 bypass construction (incl. o/w sep)	\$20,000 to 80,000 [b]	0	0	\$20,000 to 80,000
— / Lagoon #2 reconstruction sludge stabilization	\$300,000 to 400,000	0	0	\$300,000 to 400,000
— / Additional catch basin / manhole near Lagoon #1	\$5,000 to 6,000	0	\$5,000 to 6,000	0
	\$375,000 to 566,000	\$0	\$55,000 to 86,000	\$320,000 to 480,000

a depends on type of operation selected

b depends on facilities installed, ranging from temporary cross-connections w/ sanitary to permanent equalization/ow separator

CDF006971

2(b)
3

PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119

PARESCL/997/Dee/EJK7-56

25 September 1997

RECEIVED
SEP 26 1997
CANTON DROP FORGE

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Options for Addressing Side Slope Construction in Lagoon No. 1

Dear Keith:

As we discussed on 24 September 1997, there are four viable options which may be considered for addressing the side slope construction in Lagoon No. 1 at Canton Drop Forge, Inc. (CDF). These are described and evaluated for CDF's review and decision below. Also as discussed, the timing for this decision is appropriate; depending on the outcome of CDF's deliberations (i.e., the option selected), implementation of the on-going Lagoon No. 1 re-construction project may continue uninterrupted if a decision can be made within the next few days (i.e., by close-of-business (COB) on 26 September).

OBJECTIVES

Parsons Engineering Science, Inc. (Parsons ES) and The Beaver Excavating Company (Beaver), in offering the below-listed options, understand that the objectives of CDF's deliberations are as follows:

A. In order to maintain slope stability and thereby reduce future maintenance concerns and expenses, the finished slope of the Lagoon should be at least 2:1 (i.e., 2 feet over for every foot down) and would be preferable to be 3:1 or better.

B. In order to provide access around the South and West sides of Lagoon No. 1 for maintenance (of Lagoon No. 1 as well as the security fence and any other facilities), security, safety and fire protection, a minimum clearance of 12 to 15 feet must be maintained around all sides of the lagoon.

C. CDF desires that the overall size (as measured in gross volume and footprint) of Lagoon No. 1 be reduced.

D. Finally, CDF desires that, to the extent possible, the footprint of the lagoon be shifted towards the South and West by preferentially back-filling and extending the East and North banks of Lagoon No. 1, without compromising the access road around the South and West sides of the pond.

CURRENT SITUATION

As you are aware, Lagoon No. 1 is currently undergoing re-construction; as of COB on 24 September 1997, about 95% of the stabilized soil from the bio-cell had been transported to and placed in Lagoon No. 1. Also about half of the impacted soil removed from Lagoon No. 1 at the start of this phase of the project has been stabilized and placed in the lagoon. At this point Beaver estimates that about 9,700 cubic yards of space remain available in Lagoon No. 1. This is in comparison with Parsons ES' projected volume of about 2,500 cubic yards required for the continued operation of Lagoon No. 1 as a storm water retention pond.

Most of the side slopes of Lagoon No. 1 are currently at about 1:2. As indicated in the objectives defined above, these slopes are too steep and must be final graded to a more shallow 2:1 (minimum, as required in Parsons ES' design and specifications) to 3:1 (preferred) slope to prevent slippage of the consolidated clay and stabilized soil layers into the bottom of the Lagoon. This situation has likely resulted from at least four possible factors:

(1) the Lagoon is bigger than indicated in the information received from CDF and Hammontree & Associates when the project design was underway;

(2) the bottom elevation of Lagoon No. 1 was changed during design from about Elev. 1053 to Elev. 1056;

(3) the volume of material removed from the bottom of Lagoon No. 1 was less than projected (600 cubic yards);

(4) and the volume of material in the bio-cell was probably less than originally measured (as a result of shrinkage due to a reduction in the moisture content during the two-year weathering process which the material experienced from the time of placement in and removal from the bio-cell).

VIABLE OPTIONS

Parsons ES, in discussions with Beaver and CDF, has identified four (4) alternatives to achieve the required slopes. These are:

Option 1: re-grade the slopes by borrowing sufficient soil from the top and placing and compacting this material at the toe of the slopes until the required grade is achieved.

Option 2: re-grade the slopes by borrowing stabilized soil from the bottom of the lagoon and pushing and compacting this material onto the side slopes, at least as far up the slopes as practicable, to create a "bowl" effect in the bottom of Lagoon No. 1.

Option 3: final grade the slopes by importing suitable fill material from an off-site borrow area.

Option 4: final grade the slopes with yet-to-be stabilized fill material from Lagoon No. 2.

Please note that Option 4 would require an interruption in the project schedule until such time that CDF considers and evaluates the option, identifies means for finance, a portion (about 2,000 cubic yards) of Lagoon No. 2. material is removed from Lagoon No. 2 and placed in the bio-cell, the oil-impacted material is weathered and stabilized (presumably during the period of October 1997 through about May 1998) and prepared for placement and consolidation in Lagoon No. 1. The other three (3) options listed above can be accomplished essentially without interrupting the current project schedule.

EVALUATION OF THE OPTIONS

Early in our discussions, CDF and Parsons ES had dismissed Option 1 from further consideration. Although easiest and presumably least expensive to implement, this alternative does not fulfill most of the objectives (especially items B, C and D) set out above. With respect to cost, since Beaver apparently anticipated addressing the side slopes in this manner, there should be no adjustment required to Beaver's price for the project if this Option is selected. [Note: This had already been initiated for most of the South bank of the Lagoon, resulting in the removal of about five feet of the surface but leaving enough space for a road.]

Option 2 is feasible and can be used to achieve some of the objectives at least partially. In particular, the access road around the pond would be maintained and the sides (at least as far as the stabilized material could be pushed) would be re-graded to the required slope. It is not believed, however, that there is sufficient stabilized material available in the bottom of Lagoon No. 1 to completely reshape and re-grade the entire side slopes (i.e., all the way to the top of Lagoon No. 1). Also, there is not sufficient material available to achieve items C and D. The cost impact of this option would be negligible and may, in fact, result in a small credit from Beaver.

Option 3 is feasible and can be used to accomplish all four of the objectives listed above. There would be, however, a premium to the existing contract to undertake this approach. Depending on the availability of and the distance to source(s) of suitable fill material, the financial impact of this option could add $45,000 to $60,000 to the project cost; this estimates also depends on the amount of footprint reduction desired (assumed to be about 3,000 cubic yards).

Option 4 is feasible and can be used to accomplish all four objectives listed above, as well at least one of several additional objectives which CDF is considering (the re-conditioning and re-construction of Lagoon No. 2), which CDF anticipates undertaking at some point in the foreseeable future. Due to the high moisture and oil content of Lagoon No. 2 depositional material, as documented in Parsons ES' "Summary Report of the Results of Environmental and Geotechnical Sampling, Analyses and Treatability Testing of Lagoon No. 2" dated 8 September 1997, it is likely that a significant portion (at least 3,000 and possibly as much as 5,000 cubic yards) of the stabilized material is excess to that required for re-construction of Lagoon No. 2 and must be either hauled off-site for disposal (i.e., at American Landfill) or placed in berms around Lagoon No. 2.

By initiating the Lagoon No. 2 re-conditioning project, the excess depositional material could be removed from Lagoon No. 2 now (i.e., during this Fall) and placed in the bio-cell for weathering during the next six (6) months. It is believed, based on preliminary reports from the treatability laboratories (e.g., Applied Construction Technologies, Inc. and Four Season Environmental, Inc.), that the weathering process will render the material into a more easily treated matrix. The weathered material could then be stabilized much more easily, and less

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expensively, than the raw depositional material removed from the Lagoon. CDF inadvertently experienced this same phenomenon in the re-conditioning of Lagoon No. 1. The amount of possible savings achieved by following this approach could amount to $90,000 to $125,000, depending on whether on-site berming or off-site disposal is selected. If off-site disposal becomes required (i.e., primarily due to space constraints), the higher end of the range would apply. By implementing Option 4 in comparison with Option 3 (the only other approach which meets all four of CDF's objectives), as described above, CDF could achieve a total savings of about $135,000 to $185,000.

To commence Option 4, if selected, CDF should consider the following steps:

- review the quantitative results of treatability testing from Four Seasons, expected to be received about 1 October 1997; qualitative results, as reported above, have indicated that the stabilization of Lagoon No. 2 depositional material is feasible.

- authorize that Parsons ES discuss the process of stabilizing and placing Lagoon No. 2 depositional material in Lagoon No. 1 with the Ohio EPA's VAP staff, ***on a non-binding and non-disclosure basis,*** to ensure that this approach will be approvable by Ohio EPA, should CDF decide to seek closure of Lagoon No. 1 at some point in the future. This step is important to ascertain that Ohio EPA will not consider this process to be a land-filling operation, which would be regulated under RCRA, not VAP, standards. ***Parsons ES will not disclose the name or location of this project in doing so.*** Our cost to complete this task is estimated to be less than $1,000; we have found a provision for this to be completed without incurring any Ohio EPA charges (as was anticipated in our 8 September 1997 Summary Report).

- pending the outcome of the preceding two items, authorize the transfer of the most fluid portion (i.e., approximately the top 1.5 feet of depositional material) from Lagoon No. 2, probably by pumping, into the now vacated bio-cell. It is recommended that the bio-cell be subdivided into several smaller cells to prevent extensive migration of the material into the lowest (e.g., Southeastern) corner of the bio-cell). The material would then be weathered in the bio-cell until next Spring (1998) and then stabilized for placement in Lagoon No. 1.

- pending the outcome of the first two steps, initiate the design and development of temporary Lagoon No. 2 bypass drainage facilities. These are required to permit the concurrent discharge of plant process and storm water to Lagoon No. 3 and re-conditioning and reconstruction work in Lagoon No. 2. Parsons ES' recommendations pertaining to the bypass facilities are forthcoming.

In the meantime, Lagoon No. 1 would be temporarily finished by completing the bottom clay layer to an elevation of about Elev. 1061 (i.e., just above the 8" diameter storm sewer originating along the West side of the Upsetter Building). The clay layer would be compacted to at least 90% of the Standard Proctor for this material. Finally, the stabilized material would be re-shaped into "bowl" effect by pushing the material into an approximate 3:1 slope from a low spot (e.g., sump) in the Southeast corner of Lagoon No. 1. The top surface of the re-shaped stabilized soil would be compacted and rolled smooth. The pump and discharge line would then be installed as planned. The upper reaches (i.e., from Elev. 1061 to Elev. 1070) of bottom clay layer and the

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entire top clay layer would not be installed until after the additional material from Lagoon No. 2 was added to Lagoon No. 1, presumably in or after May 1998.

RECOMMENDATION

Parsons ES recommends that, for financial as well as slope stability reasons, as well as achieving CDF's project and overall business objectives, Option 4 be selected and implemented. We are available to discuss these options, our analyses and recommendation in more detail, if desired. Please let me know at (216) 486-9005 if you would like additional information and what is CDF's selection. As always, Parsons ES is prepared to support CDF in this and any other of its environmental services requirements.

Most sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Edward J. Karkalik

Edward J. Karkalik, PE
Project Manager

EJK/dee

cc: Mr. Wilson H. Rownd, PE
Ms. Elizabeth McCartney, PE
Mr. Gordon Melle, PE
Mr. Sam Saad
File 73139703000

PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119

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1 October 1997

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Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Lagoon No. 2 Bypass Drainage Facilities

Dear Keith:

In accordance with our proposal dated 23 June 1997, attached is Parsons Engineering Science, Inc.'s (Parsons ES') letter report, summarizing the results of our analyses, conceptual design and cost estimating for Lagoon No. 2 Bypass Drainage Facilities. Parsons ES understands that the objectives of providing these facilities are:

- to provide a means to discharge process and storm water flows from CDF's plant and the Western two-thirds of CDF's property; and
- to permit the removal of Lagoon No. 2 from service temporarily while the Lagoon is re-conditioned and re-constructed.

Although not a specific CDF objective, Parsons ES understands that it may be desirable, from long-term maintenance and cost-control perspectives, that a permanent, but simple means of pre-treating process effluent streams from plant operations be provided concurrently. Thus, the majority of solids and oil from the 12-inch diameter sewer serving the central plant area would be removed prior to discharging to Lagoon No. 2. The solids and oil being discharged would be collected in an easily accessible and maintainable containment vessel (i.e., a simple gravity separator) and Lagoon No. 2 would then serve as a polishing pond and means to address overflow situations.

By diverting the flows from Lagoon No. 2, the majority of water (and oil) normally entering Lagoon No. 2 (i.e., during all operations, except for major storm events) will be eliminated. As a result, re-construction and long-term maintenance of Lagoon No. 2 will be more cost-effective. This will more than off-set the initial costs for installation, since the majority of the oil normally collected in, and recovered from, Lagoon No. 2 will be removed prior to discharge to the Lagoon.

Because it is impractical, primarily due to cost, to develop facilities sufficiently large to avoid discharging directly to Lagoon No. 2 during significant storm events, there will probably be several periods during which the re-construction project will be disrupted and delayed (i.e., while the overflow water is pumped out, the work area is dried and stabilized, and the project can be re-initiated). There is a trade-off, which must be balanced, between the costs for such disruptions and delays (incurred by the construction contractor and passed to CDF) and the costs for installation of temporary facilities to collect, equalize and pump the storm water flows directly to Lagoon No. 3. Parsons ES understands that a little inconvenience during the re-construction project is probably more desirable than incurring the significant capital expenditures which will be required to handle the large flow rates anticipated during a 2-, 5-, or 10-year storm event.

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Please note that a significant portion (75-85%) of the recommended option's (e.g., Option C in the attachment) cost represents expenditures for fixed assets which will remain in service as permanent CDF facilities long after these projects are completed. For example, the tank (which serves the purpose of an equalization basin during the re-construction project) can function, with a minimal degree of modification, as an oil/water separator in the long-term. All of the piping modifications into and from the tank will remain as permanent facilities. Also, the pump and discharge piping to Lagoon No. 3 can be salvaged, relocated and re-used in the permanent facilities of the Lagoon No. 2 re-construction project.

Two additional options, for providing temporary bypass facilities during Lagoon No. 2 re-construction, had been considered: A direct connection from the 12-inch combined process/storm water sewer discharge point to the Lagoon's wet well and a sheet-piled section comprising the western-most portion of the Lagoon. In the first option, an 8- to 12-inch diameter sewer line would be installed, either underground along the alignment of the southern bank, following the water-line (but at a level about two feet below the Lagoon's current water surface) or on a pipe bridge directly across the Lagoon. The base cost for this installation, which would necessarily be abandoned or demolished at the conclusion of the Lagoon No. 2 re-construction project, would range from about $40,000 to $90,000, depending on the route and approach selected. The latter option, involving the isolation of a section of the Lagoon by driving interlocking sheet-pile into the confining unit beneath the Lagoon, also would not result in any permanent facilities. Additionally, this approach would, in our experience,, pose potentially significant health and safety (H&S) risks to the contractor (and, ultimately, CDF) during work in the Lagoon. Finally, due to the high cost, i.e., estimated to be in the range from $75,000 to $110,000, this option had been dismissed.

Please advise if additional detail or other variations are desired. We look forward to providing continued support to Canton Drop Forge in this and any of its other environmental requirements.

Most sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Ed Karkalik

Edward J. Karkalik, PE
Project Manager

EJK/dee
cc: Mr. Gordon Melle, PE
Ms. Elizabeth McCartney, PE
File 73139705000

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Canton Drop Forge, Inc.

Lagoon No. 2 Bypass Drainage Facilities

Summary of Conceptual Design Evaluation

The hydrology associated with Lagoon No. 2 has been evaluated to determine the requirements for bypassing the process and storm water flow during the re-conditioning and re-construction of the Lagoon. Process and storm water enters the Lagoon through a 12-inch diameter sewer line from a northwesterly direction and a 16-inch diameter sewer from a southwesterly direction. Storm water also enters the lagoon from surface runoff overland. The 12-inch line is estimated to handle the runoff from approximately 7 acres, the 16-inch line from approximately 2.5 acres, and overland runoff to the Lagoon from approximately 6.5 acres.

The hydrology was evaluated for 2-, 5-, and 10-year storm events. Typically, sewers are designed for 10-year design storm flows, but it would appear that the sewers at Canton Drop Forge are not sized to handle this flow. The theoretical flow from the design storms was adjusted to account for the limitations of existing sewer sizes and the obstructions in the overland flow areas (e.g., berms around the bio-cell area) which increase the travel time, thus decreasing the peak flow. The peak and total storm flow rates were used to determine the size of pumps and equalization facilities, which would be required to handle a bypass of the Lagoon during the re-conditioning and re-construction project. It was concluded from this analysis that it is not practical to provide a bypass which could handle the flows from even a 2-year design storm. Either very large pumps or large equalization facilities (or a combination of both) are required to handle the infrequent peak flows of these random storm events. An order-of-magnitude cost is presented below for an (unlikely) option, which would handle the 2-year design storm peak flow, utilizing eight (8) 15 HP pumps, discharging through an 18-inch diameter pipe. The pumps would be located in a wet well, or equalization tank, with a capacity of at least 1,300 cubic feet (9,700 gallons). As you can see, this approach is cost-prohibitive.

Canton Drop Forge, Inc. (CDF) had indicated an interest in installing one (or more) oil/water separator(s) in the sewer lines from the plant to capture any potential oil discharges which may result from operations, provided that the costs for doing so are justifiable (i.e., on the grounds of reduced, long-term maintenance expense). Calculations to size an oil/water separator, designed to American Petroleum Institute (API) standards, were made. To handle the full pipe flow from the two sewers would require a separator 7 feet deep, 100 feet wide, and 170 feet long. Construction of such a separator is not practical. Therefore, a separator which would handle a smaller flow (the process flow and the first approximately 15-minute increment of storm runoff), and would bypass larger flows (i.e., to prevent washout of collected oil), is proposed.

Four (4) options have been evaluated for an oil/water separator:

1) an API separator constructed of concrete,

2) a prefabricated (e.g., Highland) tank system,

3) a separator utilizing an existing 20,000-gallon tank modified with baffles, and

4) a separator utilizing the lower 8 feet of a modified, existing 40- to 80-foot diameter above-ground storage tank (AST) available from another industrial client; the cut-down and modified AST would be installed below grade.

In any case, the API separator would be designed for flows of 1 cubic foot per second (cfs), i.e., 450 gallons per minute (gpm), and would be 3 feet deep, 10 feet wide, and 68 feet long. The 20,000-gallon tank, modified with an underflow baffle and a sludge baffle, would be adequate to treat only about 0.5 cfs (i.e., 225 gpm). If parallel plates were added to the tank, the capacity would be increased to as much as 4 cfs (1,800 gpm). By modifying the AST with internal baffles, the tank could be operated as a 1.5 to 6 cfs (675 to 2,700 gpm) API separator. Alternatively, one 40,000-gallon or two 20,000-gallon prefabricated tanks would be adequate.

The oil/water separator would be used, with temporary pumps during the re-construction project, for flow equalization. Large flows (i.e., over the capacity of the discharge pumps) would bypass the equalization tank and overflow directly to the Lagoon. The reconstruction project should be developed to accommodate these periodic discharges (i.e., temporary shutdown of work, pump-out the Lagoon, etc.). It should be noted that significant disruptions to and delays in the re-construction project could be experienced due to overflow episodes. The construction contract and schedule should be developed to reflect the possibility of occurrence of these events.

The following table summarizes the four (4) oil/water separator options, their oil/water separation capacities, and an order-of-magnitude cost estimate for the construction. The cost estimates include one 10 HP pump (which will be relocated to the discharge system in Lagoon No. 2 at the end of the re-construction project) and 6-inch diameter, Schedule 80 HDPE discharge piping temporarily installed above-grade from the separator to Lagoon No. 3. [Note: The above-grade piping would be protected with sleeves and/or earthen cover in areas subject to vehicular traffic.] The table also includes the cost for a system which would bypass the 2-year design storm flow around Lagoon No. 2 by maximizing the pump capacity and minimizing the equalization volume.

Separator Option	Separator Capacity	Range of Estimated Construction Cost
A. Concrete tank	1 cfs	\$100,000 - \$150,000*
B. Prefabricated tank(s)	0.5-4 cfs	\$85,000 - \$225,000*
C. 20,000-gallon tank	0.5-4 cfs	\$80,000 - \$125,000*
D. 80-foot diameter tank	6 cfs	\$160,000 - \$220,000*
Bypass Option	**Pumping Capacity**	**Range of Estimated Construction Cost**
E. 2-year design storm, minimize equalization volume	15 cfs total	\$250,000 - \$300,000

* Note: Approximately \$60,000 to \$70,000 (\$100,000 in Option B) of these costs represent expenditures for fixed assets which will remain in service as part of CDF's permanent drainage facilities after the completion of the environmental projects. These facilities include the modifications to the existing sewer lines currently discharging into Lagoon No. 2, the modification or construction and installation of the tank as oil/water separator, and the purchase of a 10 HP pump and motor unit as well as 1,000 feet of 6-inch diameter pipe which will be relocated and re-used as part of the plant's permanent drainage system between Lagoons No. 2 and No. 3.

A breakdown of the estimated baseline costs for the preferred approach, Option C using the existing 20,000-gallon tank as an equalization chamber (and later an API separator), are as follows:

Clean, purge, modify (e.g., baffles, plates and inlet/outlet changes) tank	$15,000*
Modify 12-inch and 16-inch diameter lines into tank	$15,000
Construct 20-inch diameter bypass around oil/water separator	$5,000
Install tank, including excavation and back-filling	$5,000
Purchase and install 10 HP pump/motor unit, electrical power and controls	$20,000
Purchase and install 1,000 feet of 6-inch diameter piping above-grade to Lagoon No. 3	$20,000
TOTAL	**$80,000**

***Note: about $6,000-$9,000 of this amount is budgeted for converting the equalization tank into an API separator; total costs for this approach can be reduced to a range from about $75,000 to $115,000, if the separator conversion is not desired.**

The upper end of the range for this estimate ($125,000; see table on previous page) reflects the potential impact of contingencies and unforeseen events, such as the requirement for:

(1) additional repairs or modifications to the 20,000-gallon tank, influent sewer lines or any other utilities which may be encountered during construction;

(2) below-grade installation of significant sections of the discharge line (to Lagoon No. 3), due to traffic crossings or other potential conflicts;

(3) stabilization of difficult soil conditions in the excavations for the tank or sewer lines;

(4) extension of electrical service from a point originating in the plant rather than the pump house at Lagoon No. 2; and

(5) addressing any other currently undefined problems.

Storm Water Hydrology

The storm water flow for the Lagoon No. 2 watershed was calculated using the SCS TR-55 Urban Hydrology for Small Watersheds computer model. The flow was calculated for 2-, 5-, and 10-year frequency 24-hour design storms. The watershed was divided into two sub-areas, one sub-area includes the flow which enters the Lagoon through storm sewers and the second sub-area is for surface flow into the Lagoon. The peak discharge from each of the areas for the three design storms is summarized in the following table. The peak flow from the main plant area which would be discharging through the 12-inch sewer exceeds the capacity of the sewer. The overland flow would also probably be lower than calculated because of the various obstructions which would slow down the water flow increasing the travel time over was could be simulated in the computer model. To evaluate the needs for an equalization tank and bypass system, the peak flow was adjusted to account for this reduced capacity.

24 Hour Design Storm Frequency	Peak Flow, Cubic Feet per Second (CFS) Storm Sewers Original	Storm Sewers Adjusted	Overland Flow Original	Overland Flow Adjusted	Total Original	Total Adjusted
2-Year	25	12.5	7	4	32	16.5
5-Year	38	15.8	13	9	51	24.8
10-Year	44	17.2	17	12	61	29.2

Bypass Sizing

In order to minimize the required size of the Lagoon bypass pumps, a flow equalization basin or tank is proposed. The existing pumps and discharge line from Lagoon No 2 to Lagoon No 3 are not adequate for use in the bypass operation (these facilities now have the flexibility afforded by the large equalization volume of Lagoon No. 2). A temporary overflow line will be required. The required sizes of the basin or tank and the associated pump(s) and discharge piping are summarized in the following table:

Pump Flow Rate CFS	Pump Flow Rate GPM	Pipe Size Inches	No. of Pumps	Motor Size HP	Flow Equalization Volume, Cubic Feet 2 Year	5 Year	10 Year
2	900	8	1	15	33,000	60,000	
2.6	1200	8	1	20			67,000
4	1800	10	1	30	26,000	48,000	59,000
6	2700	12	1	40	22,000	42,000	52,000
8	3600	12	1	75	18,000	38,000	47,000
10	4500	16	2	40	16,000	34,000	43,000
15	6700	18	2	75	10,000	26,000	35,000

Sizing the flow equalization volume for less than the 10-year design storm increases the probability that an overflow to Lagoon No. 2 will occur, potentially significantly disrupting the re-construction project (ses discussion of potential impacts above).

Oil/Water Separator

An oil/water (O/W) separator would need to be designed with an overflow. An O/W separator designed in accordance with American Petroleum Institute (API) standards for a flow rate of 1 cfs would need to be 3 feet deep by 10 feet wide by 68 feet long. A separator designed for 10 cfs would be 7 feet deep by 40 feet wide by 170 feet long (i.e., not a practical construction).

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PARESCL/997/Dce/EJK7-66

26 September 1997

CAPPED AWAY w/ O/W SEPARATOR
USE 1/2 LAGOON FOR OVER FLOWS
O/W NOT ONE OF OUR OBJECTIVES
WHAT IS EXISTING PUMP CAPACITY #HP?

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Lagoon No. 2 Bypass Drainage Facilities

Dear Keith:

In accordance with our proposal dated 23 June 1997, attached is Parsons Engineering Science, Inc.'s (Parsons ES') letter report , summarizing the results of our analyses, conceptual design and cost estimating for Lagoon No. 2 Bypass Drainage Facilities. Parsons ES understands that the objectives of providing these facilities are:

- ✓ to provide a means to discharge process and storm water flows from CDF's plant and the Western two-thirds of CDF's property;
- ✓ to permit the removal of Lagoon No. 2 from service temporarily while the Lagoon is re-conditioned and re-constructed; and
- No to provide a permanent means of pre-treating process effluent streams from the plant operation, removing the majority of oil from the streams (primarily from the 12-inch diameter sewer serving the central plant area).

NO

By diverting these flows from Lagoon No. 2, the majority of water (and oil) normally entering Lagoon No. 2 (i.e., during all operations, except for major storm events) will be eliminated. As a result, maintenance and re-construction of Lagoon No. 2 will be easier and more cost-effective. Also, in the longer term, maintenance of Lagoon No. 2 will be less expensive since the majority of the oil normally collected in, and recovered from, Lagoon No. 2 will be removed prior to the impacted streams' arrival at the Lagoon.

Because it is impractical, primarily due to cost, to develop facilities sufficiently large to avoid bypassing the proposed equalization and pumping system and, hence, to avoid discharging directly to Lagoon No. 2 during significant storm events, there will probably be several periods during which the re-construction project will be disrupted and delayed (i.e., while the water is pumped out, the work area within the Lagoon is dried and stabilized, and the project can be re-initiated). There is a trade-off, which must be balanced, between the costs for such disruptions and delays, incurred by CDF and the construction contractor, and the costs for installation of temporary facilities to collect, equalize and pump the storm water flows directly to Lagoon No. 3. Parsons ES understands that a little inconvenience during the re-construction project is probably more desirable than incurring the significant capital expenditures which will be required to handle the large flow rates anticipated during a 2-, 5-, or 10-year storm event.

Please note that a significant portion (75-85%) of the recommended option's (e.g., Option B in the attachment) cost represents expenditures for fixed assets which will remain in service long after these projects are completed as permanent CDF facilities. For example, the tank (which

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serves the purpose of an equalization basin during the re-construction project) will function as an oil/water separator in the long-term. All of the piping modifications into and from the tank will remain as permanent facilities. Also, the pump and discharge piping to Lagoon No. 3 can be salvaged, relocated and re-used in the permanent facilities of the Lagoon No. 2 re-construction project.

Please advise if additional detail or other variations are desired. We look forward to providing continued support to Canton Drop Forge in this and any of its other environmental requirements.

Most sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Ed Karkalik

Edward J. Karkalik, PE
Project Manager

EJK/dee
cc: Mr. Gordon Melle, PE
Ms. Elizabeth McCartney, PE
File 73139705000

Canton Drop Forge, Inc.

Lagoon No. 2 Bypass Drainage Facilities

Summary of Conceptual Design Evaluation

The hydrology associated with Lagoon No. 2 has been evaluated to determine the requirements for bypassing the process and storm water flow during the re-conditioning and re-construction of the Lagoon. Process and storm water enters the Lagoon through a 12-inch diameter sewer line from a northwesterly direction and a 16-inch diameter sewer from a southwesterly direction. Storm water also enters the lagoon from surface runoff overland. The 12-inch line is estimated to handle the runoff from approximately 7 acres, the 16-inch line from approximately 2.5 acres, and overland runoff to the Lagoon from approximately 6.5 acres.

The hydrology was evaluated for 2-, 5-, and 10-year design flows. Typically, sewers are designed for 10-year design storm flows but it would appear that the sewers at Canton Drop Forge are not sized to handle this flow. The theoretical flow from the design storms was adjusted to account for the limitations of existing sewer sizes and the obstructions in the overland flow areas (e.g., berms around the bio-cell area) which increase the travel time, thus decreasing the peak flow. The peak and total storm flow rates were used to determine the size of pumps and equalization facilities, which would be required to handle a bypass of the Lagoon during the re-conditioning and re-construction project. It was concluded from this analysis that it is not practical to provide a bypass which could handle the flows from even a 2-year design storm. Either very large pumps or large equalization facilities (or a combination of both) are required to handle the infrequent peak flows of these random storm events. An order-of-magnitude cost is presented below for an (unlikely) option which would handle the 2-year design storm peak flow utilizing eight (8) 15 HP pumps, discharging through an 18-inch diameter pipe. The pumps would be located in a wet well, or equalization tank, with a capacity of at least 1,300 cubic feet (9,700 gallons). As you can see, this approach results in a prohibitive cost.

Canton Drop Forge, Inc. (CDF) has expressed an interest in installing one (or more) oil/water separator(s) in the sewer lines from the plant to capture any potential oil discharges which may result from operations. Calculations to size an oil/water separator, designed to American Petroleum Institute (API) standards, were made. To handle the full pipe flow from the two sewers would require a separator 7 feet deep, 100 feet wide, and 170 feet long. Construction of such a separator is not practical; therefore, a separator which would handle a smaller flow (the process flow and the first approximately 15-minute increment of storm runoff) and would bypass larger flows (i.e., to prevent washout of collected oil) is proposed. No

Three (3) options have been evaluated for an oil/water separator:

1) an API separator constructed of concrete,
2) a separator utilizing an existing 20,000-gallon tank modified with baffles, and
3) a separator utilizing the lower 8 feet of a modified, existing 40- to 80-foot diameter above-ground storage tank (AST) available from another industrial client; the cut-down and modified AST would be installed below grade.

In any case, the API separator would be designed for flows of 1 cubic foot per second (cfs), i.e., 450 gallons per minute (gpm), and would be 3 feet deep, 10 feet wide, and 68 feet long. The 20,000-gallon tank, modified with an underflow baffle and a sludge baffle, would be adequate to treat only about 0.5 cfs (i.e., 225 gpm). If parallel plates were added to the tank, the capacity would be increased to as much as 4 cfs (1,800 gpm). By modifying the AST with internal baffles, the tank could be operated as a 1.5 to 6 cfs (675 to 2,700 gpm) API separator.

The oil/water separator could be used with temporary pumps during the re-construction project to equalize and bypass small flows. Flows over the capacity of the discharge pumps would bypass the oil/water separator and discharge directly to the Lagoon. The reconstruction project should be developed to handle these periodic discharges (i.e., temporary shutdown of work, pump-out the Lagoon, etc.). It should be noted that significant disruptions to and delays in the re-construction project could be experienced due to bypass episodes. The construction contract and schedule should be developed to reflect the possibility of occurrence of these events.

The following table summarizes the three oil/water separator options, their oil/water separation capacities, and an order-of-magnitude cost estimate for the construction. The cost estimates include one 10 HP pump (which will be relocated to the discharge system in Lagoon No. 2 at the end of the re-construction project) and 6-inch diameter, Schedule 80 HDPE discharge piping temporarily installed above-grade from the separator to Lagoon No. 3. [Note: The above-grade piping would be protected with sleeves and/or earthen cover in areas subject to vehicular traffic.] The table also includes the cost for a system which would bypass the 2-year design storm flow around Lagoon No. 2 by maximizing the pump capacity and minimizing the equalization volume.

Separator Option	**Separator Capacity**	**Range of Estimated Construction Cost**
A. Concrete tank	1 cfs	$100,000 - $150,000*
B. 20,000-gallon tank	0.5-4 cfs	$80,000 - $125,000*
C. 80-foot diameter tank	6 cfs	$160,000 - $220,000*
Bypass Option	**Pumping Capacity**	**Range of Estimated Construction Cost**
D. 2-year design storm, minimize equalization volume	15 cfs total	$250,000 - $300,000

* Note: Approximately $60,000 to $70,000 of these costs represent expenditures for fixed assets which will remain in service as part of CDF's permanent drainage facilities after the completion of the environmental projects. These facilities include the modifications to the existing sewer lines currently discharging into Lagoon No. 2, the modification or construction and installation of the tank as oil/water separator, and the purchase of a 10 HP pump and motor unit as well as 1,000 feet of 6-inch diameter pipe which will be relocated and re-used as part of the plant's permanent drainage system between Lagoons No. 2 and No. 3.

A breakdown of the estimated baseline costs for Option B, utilizing the existing 20,000-gallon tank as an API separator, are as follows:

Clean, purge, modify (e.g., baffles, plates and inlet/outlet changes) tank	$15,000
Modify 12-inch and 16-inch diameter lines into tank	$15,000
Construct 20-inch diameter bypass around oil/water separator	$5,000
Install tank, including excavation and back-filling	$5,000
Purchase and install 10 HP pump/motor unit, electrical power and controls	$20,000
Purchase and install 1,000 feet of 6-inch diameter piping above-grade to Lagoon No. 3	$20,000
TOTAL	**$80,000**

The upper end of the range for this estimate ($125,000; see table on previous page) reflects the potential impact of contingencies and unforeseen events, such as the requirement for:

(1) additional repairs or modifications to the 20,000-gallon tank, influent sewer lines or any other utilities which may be encountered during construction;

(2) below-grade installation of significant sections of the discharge line (to Lagoon No. 3), due to traffic crossings or other potential conflicts;

(3) stabilization of difficult soil conditions in the excavations for the tank or sewer lines;

(4) extension of electrical service from a point originating in the plant rather than the pump house at Lagoon No. 2; and

(5) addressing any other currently undefined problems.

Storm water Hydrology

The storm water flow for the Lagoon No. 2 watershed was calculated using the SCS TR-55 Urban Hydrology for Small Watersheds computer model. The flow was calculated for 2-, 5-, and 10-year frequency 24-hour design storms. The watershed was divided into two sub-areas, one sub-area includes the flow which enters the Lagoon through storm sewers and the second sub-area is for surface flow into the Lagoon. The peak discharge from each of the areas for the three design storms is summarized in the following table. The peak flow from the main plant area which would be discharging through the 12-inch sewer exceeds the capacity of the sewer. The overland flow would also probably be lower than calculated because of the various obstructions which would slow down the water flow increasing the travel time over was could be simulated in the computer model. To evaluate the needs for an oil/water separator and bypass system, the peak flow was adjusted to account for this reduced capacity.

24 Hour Design Storm Frequency	Peak Flow, Cubic Feet per Second (CFS) Storm Sewers Original	Adjusted	Overland Flow Original	Adjusted	Total Original	Adjusted
2-Year	25	12.5	7	4	32	16.5
5-Year	38	15.8	13	9	51	24.8
10-Year	44	17.2	17	12	61	29.2

Bypass Sizing

In order to minimize the required size of the Lagoon bypass pumps, a flow equalization basin or tank is proposed. The existing pumps and discharge line from Lagoon No 2 to Lagoon No 3 are not adequate for use in the bypass operation (these facilities now have the flexibility afforded by the large equalization volume of Lagoon No. 2). A temporary bypass line will be required. The required sizes of the basin or tank and the associated pump(s) and discharge piping are summarized in the following table:

Pump Flow Rate CFS	GPM	Pipe Size Inches	No. of Pumps	Motor Size HP	Flow Equalization Volume, Cubic Feet 2 Year	5 Year	10 Year
2	900	8	1	15	33,000	60,000	
2.6	1200	8	1	20			67,000
4	1800	10	1	30	26,000	48,000	59,000
6	2700	12	1	40	22,000	42,000	52,000
8	3600	12	1	75	18,000	38,000	47,000
10	4500	16	2	40	16,000	34,000	43,000
15	6700	18	2	75	10,000	26,000	35,000

Sizing the flow equalization volume for less than the 10-year design storm increases the probability that an overflow to Lagoon No. 2 will occur, potentially significantly disrupting the re-construction project..

Oil/Water Separator

An oil/water (O/W) separator would need to be designed with a bypass. An O/W separator designed in accordance with American Petroleum Institute (API) standards for a flow rate of 1 cfs would need to be 3 feet deep by 10 feet wide by 68 feet long. A separator designed for 10 cfs would be 7 feet deep by 40 feet wide by 170 feet long.

Unaudited

Canton Drop Forge, Inc.

Environmental Projects Status
as of September 26, 1997

Canton Drop Forge, Inc. Authorizations			Parsons Engineering Science, Inc. Implementation/Status		
P.O. Number	Description	Amount	WBS	Status of Work	Amount Spent
98072	Lagoon #1 / Biocell Study	$17,909	731397-01000	Complete, minor ODCs pending.	$17,048
98867	Lagoon #1 Sewers	$1,600	731397-02000	Complete, closed.	$1,600
98575	Lagoon #1 Design/Construction	$26,927	731397-03000	Construction underway; 90% complete overall.	$23,298
Pending	Lagoon #1 Contract Negotiation	$2,867	731397-03001	Complete.	$2,867
Pending	Lagoon #1 Add'l Constr'n Observation	$1,000	731397-03002	Pending progress within original authorization.	$0
98576	Lagoon #2 Sampling	$14,317	731397-04000	Complete, lab invoices pending.	$6,374
98622	Lagoon #2 Bypass Pre-Design	$2,600	731397-05000	Report issued; complete, closed.	$2,600
	Subtotal	**$67,220**		Subtotal	**$53,787**
98252	Condensate Sampling	$7,000	731549-01000	Complete, minor ODCs pending.	$6,693
98623	Condensate Testing	$6,600	731549-02000	Complete, closed.	$6,600
	Subtotal	**$13,600**		Subtotal	**$13,293**
	TOTAL	**$80,820**		**TOTAL**	**$67,080**

CDF006989

Keith Housekneckt
- f.y.i.
Gene

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2 (b)
3

CANTON DROP FORGE INDUSTRIAL PRETREATMENT

P.O. #98072	$19,109	ASSESSMENT	
DATE	INVOICE AMT.	INVOICE NO.	DESCRIPTION
5/6/97	$ 1,244.36	696664	Parsons
6/22/97	$ 12,153.68	741150	Parsons
6/22/97	$ 1,168.29	741150	Parsons
7/11/97	$ 1,467.87	755148	Parsons
7/11/97	$ 31.61	755148	Parsons
8/6/97	$ 1,699.86	802108	Parsons
9/17/97	$ 303.27	838508	Parsons
TOTAL INVOICED	$ 18,068.94		

P.O. #98252	$7,000	INVESTIGATION	
DATE	INVOICE AMT.	INVOICE NO.	DESCRIPTION
6/16/97	$ 2,497.55	725147	Parsons
7/8/97	$ 3,692.85	755151	Parsons
8/8/97	$ 127.60	810971	Parsons
9/10/97	$ 141.64	838512	Parsons
TOTAL INVOICED	$ 6,459.64		

P.O. #98622	$ 2,600.00	DRAINAGE DESIGN	
DATE	INVOICE AMT.	INVOICE NO.	DESCRIPTION
8/6/97	$ 1,038.25	802110	Parsons
9/17/97	$ 511.13	838511	Parsons
TOTAL INVOICED	$ 1,549.38		

98367 ?

P.O. #98623	$ 6,600.00	DEMULSIBILITY	
DATE	INVOICE AMT.	INVOICE NO.	DESCRIPTION
7/7/97	$ 157.50	95449	C.T.C.
TOTAL INVOICED	$ 157.50		

P.O. #98623	$6,600	FILTRATION TEST	
DATE	INVOICE AMT.	INVOICE NO.	DESCRIPTION
7/8/97	$ 1,141.24	755152	Parsons
1/1/00	$ 3,904.26	802112	Parsons
9/10/97	$ 1,554.50	838513	Parsons
TOTAL INVOICED	$ 6,600.00		

P.O. #98575	$26,927	LAG 1 ASSESS.	
DATE	INVOICE AMT.	INVOICE NO.	DESCRIPTION
7/11/97	$ 1,390.57	755149	Parsons
8/6/97	$ 12,115.09	802109	Parsons
9/17/97	$ 6,652.99	838509	Parsons

CANTON DROP FORGE INDUSTRIAL PRETREATMENT

TOTAL INVOICED $ 20,158.65

P.O. #98576	$14,317		LAG 2 ASSESS.	
DATE		INVOICE AMT.	INVOICE NO.	DESCRIPTION
8/6/97	$	2,468.41	811452	Parsons
9/17/97	$	1,266.05	838510	Parsons
TOTAL INVOICED	$	3,734.46		

P.O. #98867	$	1,600.00	LAG 1	
DATE		INVOICE AMT.	INVOICE NO.	DESCRIPTION
7/23/97	$	400.10	795203	Parsons
TOTAL INVOICED	$	400.10		

Copy JBA 2(b) 3

PARSONS ENGINEERING SCIENCE, INC.

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

TO: Keith Hardwicke
LOCATION: CDF
RAPIDFAX NO.: 330-477-2046
COPIES TO:

FROM: Ed Kaczkowski
LOCATION:
DATE: 1 October 1997

TOTAL NUMBER OF PAGES 7 (including this cover letter)

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PARSONS ENGINEERING SCIENCE, INC.
CLEVELAND, OH 44119 - RAPIDFAX (216) 486-6119

Keith -

Here is revised report, as we discussed.

As indicated in our conversation, temporary cross-overs to the county sewer system may be the best approach provided:

1. they are physically feasible
2. there is adequate capacity
3. the County sewer district does not object
4. the DOW does not object
5. the costs for tie-ins and discharge fees are not too high.

Ed

02000C01

JOB NUMBER 731397.05000

PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119
PARESCL/997/Dee/EJK7-66 REVISED

1 October 1997

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Lagoon No. 2 Bypass Drainage Facilities

Dear Keith:

In accordance with our proposal dated 23 June 1997, attached is Parsons Engineering Science, Inc.'s (Parsons ES') letter report, summarizing the results of our analyses, conceptual design and cost estimating for Lagoon No. 2 Bypass Drainage Facilities. Parsons ES understands that the objectives of providing these facilities are:

- to provide a means to discharge process and storm water flows from CDF's plant and the Western two-thirds of CDF's property; and
- to permit the removal of Lagoon No. 2 from service temporarily while the Lagoon is re-conditioned and re-constructed.

Although not a specific CDF objective, Parsons ES understands that it may be desirable, from long-term maintenance and cost-control perspectives, that a permanent, but simple means of pre-treating process effluent streams from plant operations be provided concurrently. Thus, the majority of solids and oil from the 12-inch diameter sewer serving the central plant area would be removed prior to discharging to Lagoon No. 2. The solids and oil being discharged would be collected in an easily accessible and maintainable containment vessel (i.e., a simple gravity separator) and Lagoon No. 2 would then serve as a polishing pond and means to address overflow situations.

By diverting the flows from Lagoon No. 2, the majority of water (and oil) normally entering Lagoon No. 2 (i.e., during all operations, except for major storm events) will be eliminated. As a result, re-construction and long-term maintenance of Lagoon No. 2 will be more cost-effective. This will more than off-set the initial costs for installation, since the majority of the oil normally collected in, and recovered from, Lagoon No. 2 will be removed prior to discharge to the Lagoon.

Because it is impractical, primarily due to cost, to develop facilities sufficiently large to avoid discharging directly to Lagoon No. 2 during significant storm events, there will probably be several periods during which the re-construction project will be disrupted and delayed (i.e., while the overflow water is pumped out, the work area is dried and stabilized, and the project can be re-initiated). There is a trade-off, which must be balanced, between the costs for such disruptions and delays (incurred by the construction contractor and passed to CDF) and the costs for installation of temporary facilities to collect, equalize and pump the storm water flows directly to Lagoon No. 3. Parsons ES understands that a little inconvenience during the re-construction project is probably more desirable than incurring the significant capital expenditures which will be required to handle the large flow rates anticipated during a 2-, 5-, or 10-year storm event.

PARSONS

Please note that a significant portion (75-85%) of the recommended option's (e.g., Option C in the attachment) cost represents expenditures for fixed assets which will remain in service as permanent CDF facilities long after these projects are completed. For example, the tank (which serves the purpose of an equalization basin during the re-construction project) can function, with a minimal degree of modification, as an oil/water separator in the long-term. All of the piping modifications into and from the tank will remain as permanent facilities. Also, the pump and discharge piping to Lagoon No. 3 can be salvaged, relocated and re-used in the permanent facilities of the Lagoon No. 2 re-construction project.

Two additional options, for providing temporary bypass facilities during Lagoon No. 2 re-construction, had been considered: A direct connection from the 12-inch combined process/storm water sewer discharge point to the Lagoon's wet well and a sheet-piled section comprising the western-most portion of the Lagoon. In the first option, an 8- to 12-inch diameter sewer line would be installed, either underground along the alignment of the southern bank, following the water-line (but at a level about two feet below the Lagoon's current water surface) or on a pipe bridge directly across the Lagoon. The base cost for this installation, which would necessarily be abandoned or demolished at the conclusion of the Lagoon No. 2 re-construction project, would range from about $40,000 to $90,000, depending on the route and approach selected. The latter option, involving the isolation of a section of the Lagoon by driving interlocking sheet-pile into the confining unit beneath the Lagoon, also would not result in any permanent facilities. Additionally, this approach would, in our experience,, pose potentially significant health and safety (H&S) risks to the contractor (and, ultimately, CDF) during work in the Lagoon. Finally, due to the high cost, i.e., estimated to be in the range from $75,000 to $110,000, this option had been dismissed.

Please advise if additional detail or other variations are desired. We look forward to providing continued support to Canton Drop Forge in this and any of its other environmental requirements.

Most sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Ed Karkalik

Edward J. Karkalik, PE
Project Manager

EJK/dee
cc: Mr. Gordon Melle, PE
Ms. Elizabeth McCartney, PE
File 73139705000

Canton Drop Forge, Inc.

Lagoon No. 2 Bypass Drainage Facilities

Summary of Conceptual Design Evaluation

The hydrology associated with Lagoon No. 2 has been evaluated to determine the requirements for bypassing the process and storm water flow during the re-conditioning and re-construction of the Lagoon. Process and storm water enters the Lagoon through a 12-inch diameter sewer line from a northwesterly direction and a 16-inch diameter sewer from a southwesterly direction. Storm water also enters the lagoon from surface runoff overland. The 12-inch line is estimated to handle the runoff from approximately 7 acres, the 16-inch line from approximately 2.5 acres, and overland runoff to the Lagoon from approximately 6.5 acres.

The hydrology was evaluated for 2-, 5-, and 10-year storm events. Typically, sewers are designed for 10-year design storm flows, but it would appear that the sewers at Canton Drop Forge are not sized to handle this flow. The theoretical flow from the design storms was adjusted to account for the limitations of existing sewer sizes and the obstructions in the overland flow areas (e.g., berms around the bio-cell area) which increase the travel time, thus decreasing the peak flow. The peak and total storm flow rates were used to determine the size of pumps and equalization facilities, which would be required to handle a bypass of the Lagoon during the re-conditioning and re-construction project. It was concluded from this analysis that it is not practical to provide a bypass which could handle the flows from even a 2-year design storm. Either very large pumps or large equalization facilities (or a combination of both) are required to handle the infrequent peak flows of these random storm events. An order-of-magnitude cost is presented below for an (unlikely) option, which would handle the 2-year design storm peak flow, utilizing eight (8) 15 HP pumps, discharging through an 18-inch diameter pipe. The pumps would be located in a wet well, or equalization tank, with a capacity of at least 1,300 cubic feet (9,700 gallons). As you can see, this approach is cost-prohibitive.

Canton Drop Forge, Inc. (CDF) had indicated an interest in installing one (or more) oil/water separator(s) in the sewer lines from the plant to capture any potential oil discharges which may result from operations, provided that the costs for doing so are justifiable (i.e., on the grounds of reduced, long-term maintenance expense). Calculations to size an oil/water separator, designed to American Petroleum Institute (API) standards, were made. To handle the full pipe flow from the two sewers would require a separator 7 feet deep, 100 feet wide, and 170 feet long. Construction of such a separator is not practical. Therefore, a separator which would handle a smaller flow (the process flow and the first approximately 15-minute increment of storm runoff), and would bypass larger flows (i.e., to prevent washout of collected oil), is proposed.

Four (4) options have been evaluated for an oil/water separator:

1) an API separator constructed of concrete,

2) a prefabricated (e.g., Highland) tank system,

3) a separator utilizing an existing 20,000-gallon tank modified with baffles, and

4) a separator utilizing the lower 8 feet of a modified, existing 40- to 80-foot diameter above-ground storage tank (AST) available from another industrial client; the cut-down and modified AST would be installed below grade.

In any case, the API separator would be designed for flows of 1 cubic foot per second (cfs), i.e., 450 gallons per minute (gpm), and would be 3 feet deep, 10 feet wide, and 68 feet long. The 20,000-gallon tank, modified with an underflow baffle and a sludge baffle, would be adequate to treat only about 0.5 cfs (i.e., 225 gpm). If parallel plates were added to the tank, the capacity would be increased to as much as 4 cfs (1,800 gpm). By modifying the AST with internal baffles, the tank could be operated as a 1.5 to 6 cfs (675 to 2,700 gpm) API separator. Alternatively, one 40,000-gallon or two 20,000-gallon prefabricated tanks would be adequate.

The oil/water separator would be used, with temporary pumps during the re-construction project, for flow equalization. Large flows (i.e., over the capacity of the discharge pumps) would bypass the equalization tank and overflow directly to the Lagoon. The reconstruction project should be developed to accommodate these periodic discharges (i.e., temporary shutdown of work, pump-out the Lagoon, etc.). It should be noted that significant disruptions to and delays in the re-construction project could be experienced due to overflow episodes. The construction contract and schedule should be developed to reflect the possibility of occurrence of these events.

The following table summarizes the four (4) oil/water separator options, their oil/water separation capacities, and an order-of-magnitude cost estimate for the construction. The cost estimates include one 10 HP pump (which will be relocated to the discharge system in Lagoon No. 2 at the end of the re-construction project) and 6-inch diameter, Schedule 80 HDPE discharge piping temporarily installed above-grade from the separator to Lagoon No. 3. [Note: The above-grade piping would be protected with sleeves and/or earthen cover in areas subject to vehicular traffic.] The table also includes the cost for a system which would bypass the 2-year design storm flow around Lagoon No. 2 by maximizing the pump capacity and minimizing the equalization volume.

Separator Option	Separator Capacity	Range of Estimated Construction Cost
A. Concrete tank	1 cfs	\$100,000 - \$150,000*
B. Prefabricated tank(s)	0.5-4 cfs	\$85,000 - \$225,000*
C. 20,000-gallon tank	0.5-4 cfs	\$80,000 - \$125,000*
D. 80-foot diameter tank	6 cfs	\$160,000 - \$220,000*
Bypass Option	**Pumping Capacity**	**Range of Estimated Construction Cost**
E. 2-year design storm, minimize equalization volume	15 cfs total	\$250,000 - \$300,000

* Note: Approximately \$60,000 to \$70,000 (\$100,000 in Option B) of these costs represent expenditures for fixed assets which will remain in service as part of CDF's permanent drainage facilities after the completion of the environmental projects. These facilities include the modifications to the existing sewer lines currently discharging into Lagoon No. 2, the modification or construction and installation of the tank as oil/water separator, and the purchase of a 10 HP pump and motor unit as well as 1,000 feet of 6-inch diameter pipe which will be relocated and re-used as part of the plant's permanent drainage system between Lagoons No. 2 and No. 3.

A breakdown of the estimated baseline costs for the preferred approach, Option C using the existing 20,000-gallon tank as an equalization chamber (and later an API separator), are as follows:

Clean, purge, modify (e.g., baffles, plates and inlet/outlet changes) tank	$15,000*
Modify 12-inch and 16-inch diameter lines into tank	$15,000
Construct 20-inch diameter bypass around oil/water separator	$5,000
Install tank, including excavation and back-filling	$5,000
Purchase and install 10 HP pump/motor unit, electrical power and controls	$20,000
Purchase and install 1,000 feet of 6-inch diameter piping above-grade to Lagoon No. 3	$20,000
TOTAL	**$80,000**

*Note: **about $6,000-$9,000 of this amount is budgeted for converting the equalization tank into an API separator; total costs for this approach can be reduced to a range from about $75,000 to $115,000, if the separator conversion is not desired.**

The upper end of the range for this estimate ($125,000; see table on previous page) reflects the potential impact of contingencies and unforeseen events, such as the requirement for:

(1) additional repairs or modifications to the 20,000-gallon tank, influent sewer lines or any other utilities which may be encountered during construction;

(2) below-grade installation of significant sections of the discharge line (to Lagoon No. 3), due to traffic crossings or other potential conflicts;

(3) stabilization of difficult soil conditions in the excavations for the tank or sewer lines;

(4) extension of electrical service from a point originating in the plant rather than the pump house at Lagoon No. 2; and

(5) addressing any other currently undefined problems.

Storm Water Hydrology

The storm water flow for the Lagoon No. 2 watershed was calculated using the SCS TR-55 Urban Hydrology for Small Watersheds computer model. The flow was calculated for 2-, 5-, and 10-year frequency 24-hour design storms. The watershed was divided into two sub-areas, one sub-area includes the flow which enters the Lagoon through storm sewers and the second sub-area is for surface flow into the Lagoon. The peak discharge from each of the areas for the three design storms is summarized in the following table. The peak flow from the main plant area which would be discharging through the 12-inch sewer exceeds the capacity of the sewer. The overland flow would also probably be lower than calculated because of the various obstructions which would slow down the water flow increasing the travel time over was could be simulated in the computer model. To evaluate the needs for an equalization tank and bypass system, the peak flow was adjusted to account for this reduced capacity.

24 Hour Design Storm Frequency	Peak Flow, Cubic Feet per Second (CFS) Storm Sewers Original	Storm Sewers Adjusted	Overland Flow Original	Overland Flow Adjusted	Total Original	Total Adjusted
2-Year	25	12.5	7	4	32	16.5
5-Year	38	15.8	13	9	51	24.8
10-Year	44	17.2	17	12	61	29.2

Bypass Sizing

In order to minimize the required size of the Lagoon bypass pumps, a flow equalization basin or tank is proposed. The existing pumps and discharge line from Lagoon No 2 to Lagoon No 3 are not adequate for use in the bypass operation (these facilities now have the flexibility afforded by the large equalization volume of Lagoon No. 2). A temporary overflow line will be required. The required sizes of the basin or tank and the associated pump(s) and discharge piping are summarized in the following table:

Pump Flow Rate CFS	Pump Flow Rate GPM	Pipe Size Inches	No. of Pumps	Motor Size HP	Flow Equalization Volume, Cubic Feet 2 Year	5 Year	10 Year
2	900	8	1	15	33,000	60,000	
2.6	1200	8	1	20			67,000
4	1800	10	1	30	26,000	48,000	59,000
6	2700	12	1	40	22,000	42,000	52,000
8	3600	12	1	75	18,000	38,000	47,000
10	4500	16	2	40	16,000	34,000	43,000
15	6700	18	2	75	10,000	26,000	35,000

Sizing the flow equalization volume for less than the 10-year design storm increases the probability that an overflow to Lagoon No. 2 will occur, potentially significantly disrupting the reconstruction project (ses discussion of potential impacts above).

Oil/Water Separator

An oil/water (O/W) separator would need to be designed with an overflow. An O/W separator designed in accordance with American Petroleum Institute (API) standards for a flow rate of 1 cfs would need to be 3 feet deep by 10 feet wide by 68 feet long. A separator designed for 10 cfs would be 7 feet deep by 40 feet wide by 170 feet long (i.e., not a practical construction).

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CANTON DROP FORGE

serves the purpose of an equalization basin during the re-construction project) will function as an oil/water separator in the long-term. All of the piping modifications into and from the tank will remain as permanent facilities. Also, the pump and discharge piping to Lagoon No. 3 can be salvaged, relocated and re-used in the permanent facilities of the Lagoon No. 2 re-construction project.

Please advise if additional detail or other variations are desired. We look forward to providing continued support to Canton Drop Forge in this and any of its other environmental requirements.

Most sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Ed Karkalik

Edward J. Karkalik, PE
Project Manager

EJK/dee
cc: Mr. Gordon Melle, PE
Ms. Elizabeth McCartney, PE
File 73139705000

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Canton Drop Forge, Inc.

Lagoon No. 2 Bypass Drainage Facilities

Summary of Conceptual Design Evaluation

The hydrology associated with Lagoon No. 2 has been evaluated to determine the requirements for bypassing the process and storm water flow during the re-conditioning and re-construction of the Lagoon. Process and storm water enters the Lagoon through a 12-inch diameter sewer line from a northwesterly direction and a 16-inch diameter sewer from a southwesterly direction. Storm water also enters the lagoon from surface runoff overland. The 12-inch line is estimated to handle the runoff from approximately 7 acres, the 16-inch line from approximately 2.5 acres, and overland runoff to the Lagoon from approximately 6.5 acres.

The hydrology was evaluated for 2-, 5-, and 10-year design flows. Typically, sewers are designed for 10-year design storm flows but it would appear that the sewers at Canton Drop Forge are not sized to handle this flow. The theoretical flow from the design storms was adjusted to account for the limitations of existing sewer sizes and the obstructions in the overland flow areas (e.g., berms around the bio-cell area) which increase the travel time, thus decreasing the peak flow. The peak and total storm flow rates were used to determine the size of pumps and equalization facilities, which would be required to handle a bypass of the Lagoon during the re-conditioning and re-construction project. It was concluded from this analysis that it is not practical to provide a bypass which could handle the flows from even a 2-year design storm. Either very large pumps or large equalization facilities (or a combination of both) are required to handle the infrequent peak flows of these random storm events. An order-of-magnitude cost is presented below for an (unlikely) option which would handle the 2-year design storm peak flow utilizing eight (8) 15 HP pumps, discharging through an 18-inch diameter pipe. The pumps would be located in a wet well, or equalization tank, with a capacity of at least 1,300 cubic feet (9,700 gallons). As you can see, this approach results in a prohibitive cost.

Canton Drop Forge, Inc. (CDF) has expressed an interest in installing one (or more) oil/water separator(s) in the sewer lines from the plant to capture any potential oil discharges which may result from operations. Calculations to size an oil/water separator, designed to American Petroleum Institute (API) standards, were made. To handle the full pipe flow from the two sewers would require a separator 7 feet deep, 100 feet wide, and 170 feet long. Construction of such a separator is not practical; therefore, a separator which would handle a smaller flow (the process flow and the first approximately 15-minute increment of storm runoff) and would bypass larger flows (i.e., to prevent washout of collected oil) is proposed.

Three (3) options have been evaluated for an oil/water separator:

1) an API separator constructed of concrete,
2) a separator utilizing an existing 20,000-gallon tank modified with baffles, and
3) a separator utilizing the lower 8 feet of a modified, existing 40- to 80-foot diameter above-ground storage tank (AST) available from another industrial client; the cut-down and modified AST would be installed below grade.

In any case, the API separator would be designed for flows of 1 cubic foot per second (cfs), i.e., 450 gallons per minute (gpm), and would be 3 feet deep, 10 feet wide, and 68 feet long. The 20,000-gallon tank, modified with an underflow baffle and a sludge baffle, would be adequate to treat only about 0.5 cfs (i.e., 225 gpm). If parallel plates were added to the tank, the capacity would be increased to as much as 4 cfs (1,800 gpm). By modifying the AST with internal baffles, the tank could be operated as a 1.5 to 6 cfs (675 to 2,700 gpm) API separator.

The oil/water separator could be used with temporary pumps during the re-construction project to equalize and bypass small flows. Flows over the capacity of the discharge pumps would bypass the oil/water separator and discharge directly to the Lagoon. The reconstruction project should be developed to handle these periodic discharges (i.e., temporary shutdown of work, pump-out the Lagoon, etc.). It should be noted that significant disruptions to and delays in the re-construction project could be experienced due to bypass episodes. The construction contract and schedule should be developed to reflect the possibility of occurrence of these events.

The following table summarizes the three oil/water separator options, their oil/water separation capacities, and an order-of-magnitude cost estimate for the construction. The cost estimates include one 10 HP pump (which will be relocated to the discharge system in Lagoon No. 2 at the end of the re-construction project) and 6-inch diameter, Schedule 80 HDPE discharge piping temporarily installed above-grade from the separator to Lagoon No. 3. [Note: The above-grade piping would be protected with sleeves and/or earthen cover in areas subject to vehicular traffic.] The table also includes the cost for a system which would bypass the 2-year design storm flow around Lagoon No. 2 by maximizing the pump capacity and minimizing the equalization volume.

Separator Option	Separator Capacity	Range of Estimated Construction Cost
A. Concrete tank	1 cfs	\$100,000 - \$150,000*
B. 20,000-gallon tank	0.5-4 cfs	\$80,000 - \$125,000*
C. 80-foot diameter tank	6 cfs	\$160,000 - \$220,000*
Bypass Option	**Pumping Capacity**	**Range of Estimated Construction Cost**
D. 2-year design storm, minimize equalization volume	15 cfs total	\$250,000 - \$300,000

* Note: Approximately \$60,000 to \$70,000 of these costs represent expenditures for fixed assets which will remain in service as part of CDF's permanent drainage facilities after the completion of the environmental projects. These facilities include the modifications to the existing sewer lines currently discharging into Lagoon No. 2, the modification or construction and installation of the tank as oil/water separator, and the purchase of a 10 HP pump and motor unit as well as 1,000 feet of 6-inch diameter pipe which will be relocated and re-used as part of the plant's permanent drainage system between Lagoons No. 2 and No. 3.

A breakdown of the estimated baseline costs for Option B, utilizing the existing 20,000-gallon tank as an API separator, are as follows:

Clean, purge, modify (e.g., baffles, plates and inlet/outlet changes) tank	$15,000
Modify 12-inch and 16-inch diameter lines into tank	$15,000
Construct 20-inch diameter bypass around oil/water separator	$5,000
Install tank, including excavation and back-filling	$5,000
Purchase and install 10 HP pump/motor unit, electrical power and controls	$20,000
Purchase and install 1,000 feet of 6-inch diameter piping above-grade to Lagoon No. 3	$20,000
TOTAL	**$80,000**

The upper end of the range for this estimate ($125,000; see table on previous page) reflects the potential impact of contingencies and unforeseen events, such as the requirement for:

(1) additional repairs or modifications to the 20,000-gallon tank, influent sewer lines or any other utilities which may be encountered during construction;

(2) below-grade installation of significant sections of the discharge line (to Lagoon No. 3), due to traffic crossings or other potential conflicts;

(3) stabilization of difficult soil conditions in the excavations for the tank or sewer lines;

(4) extension of electrical service from a point originating in the plant rather than the pump house at Lagoon No. 2; and

(5) addressing any other currently undefined problems.

Storm water Hydrology

The storm water flow for the Lagoon No. 2 watershed was calculated using the SCS TR-55 Urban Hydrology for Small Watersheds computer model. The flow was calculated for 2-, 5-, and 10-year frequency 24-hour design storms. The watershed was divided into two sub-areas, one sub-area includes the flow which enters the Lagoon through storm sewers and the second sub-area is for surface flow into the Lagoon. The peak discharge from each of the areas for the three design storms is summarized in the following table. The peak flow from the main plant area which would be discharging through the 12-inch sewer exceeds the capacity of the sewer. The overland flow would also probably be lower than calculated because of the various obstructions which would slow down the water flow increasing the travel time over was could be simulated in the computer model. To evaluate the needs for an oil/water separator and bypass system, the peak flow was adjusted to account for this reduced capacity.

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OCT 3 1997

ANTON DROP FORGE

24 Hour Design Storm Frequency	Peak Flow, Cubic Feet per Second (CFS) Storm Sewers Original	Adjusted	Overland Flow Original	Adjusted	Total Original	Adjusted
2-Year	25	12.5	7	4	32	16.5
5-Year	38	15.8	13	9	51	24.8
10-Year	44	17.2	17	12	61	29.2

Bypass Sizing

In order to minimize the required size of the Lagoon bypass pumps, a flow equalization basin or tank is proposed. The existing pumps and discharge line from Lagoon No 2 to Lagoon No 3 are not adequate for use in the bypass operation (these facilities now have the flexibility afforded by the large equalization volume of Lagoon No. 2). A temporary bypass line will be required. The required sizes of the basin or tank and the associated pump(s) and discharge piping are summarized in the following table:

Pump Flow Rate CFS	GPM	Pipe Size Inches	No. of Pumps	Motor Size HP	Flow Equalization Volume, Cubic Feet 2 Year	5 Year	10 Year
2	900	8	1	15	33,000	60,000	
2.6	1200	8	1	20			67,000
4	1800	10	1	30	26,000	48,000	59,000
6	2700	12	1	40	22,000	42,000	52,000
8	3600	12	1	75	18,000	38,000	47,000
10	4500	16	2	40	16,000	34,000	43,000
15	6700	18	2	75	10,000	26,000	35,000

Sizing the flow equalization volume for less than the 10-year design storm increases the probability that an overflow to Lagoon No. 2 will occur, potentially significantly disrupting the re-construction project..

Oil/Water Separator

An oil/water (O/W) separator would need to be designed with a bypass. An O/W separator designed in accordance with American Petroleum Institute (API) standards for a flow rate of 1 cfs would need to be 3 feet deep by 10 feet wide by 68 feet long. A separator designed for 10 cfs would be 7 feet deep by 40 feet wide by 170 feet long.

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3

CANTON DROP FORGE, INC.

LAGOON NO. 1 RECONSTRUCTION PROJECT

PROGRESS MEETING AGENDA

3 OCTOBER 1997

Can Fire Dept.

ORDER PUMP & NEW SPOOL
SPOOL TO STAN

A. STATUS UPDATE

B. OUTSTANDING ITEMS Pressure Test?

C. PRE-CLOSURE ('97 SEASON) PLANNING

1 — SIDE SLOPE STABILIZATION
- TEMPORARY FINISHING (OCT '97)
- FINAL FINISH GRADING (1998)

SDR 35?
what is it?

2 — TOP CLAY LAYER PLACEMENT/STABILIZATION
- DELAYED TO 1998
- CLAY PURCHASE/STOCK-PILING?

3 — INFLUENT DRAIN CLOSURES/EXTENSIONS
- CLOSURES (OCT '97)
- TEMPORARY EXTENSIONS (OCT '97)
- FINAL EXTENSIONS (1998)

4 — SLOPE EROSION PROTECTION AT DRAINS
- QUOTE (OCT '97)
- FINISHING (1998)
- USE CDF CONCRETE DEBRIS?

5 — DISCHARGE LINE INSTALLATION/TESTING
- TO BE COMPLETE (OCT '97) (INCL. PAVEMENT REPLACEMENT)

6 — PUMP/PAD/MOTOR/ELECTRICAL INSTALLATION
- TO BE COMPLETE (OCT '97)

7 — PUMP SUCTION LINE/SUPPORT INSTALLATION
- CONCRETE SUPPORTS - PERMANENT (OCT '97)
- PIPE SUPPORTS - PERM/TEMP. (OCT '97)
- PIPING - TEMPORARY (OCT '97)
- FINAL PIPE SUPPORTS (1998)
- FINAL PIPING (1998)

D. FUTURE DIRECTION

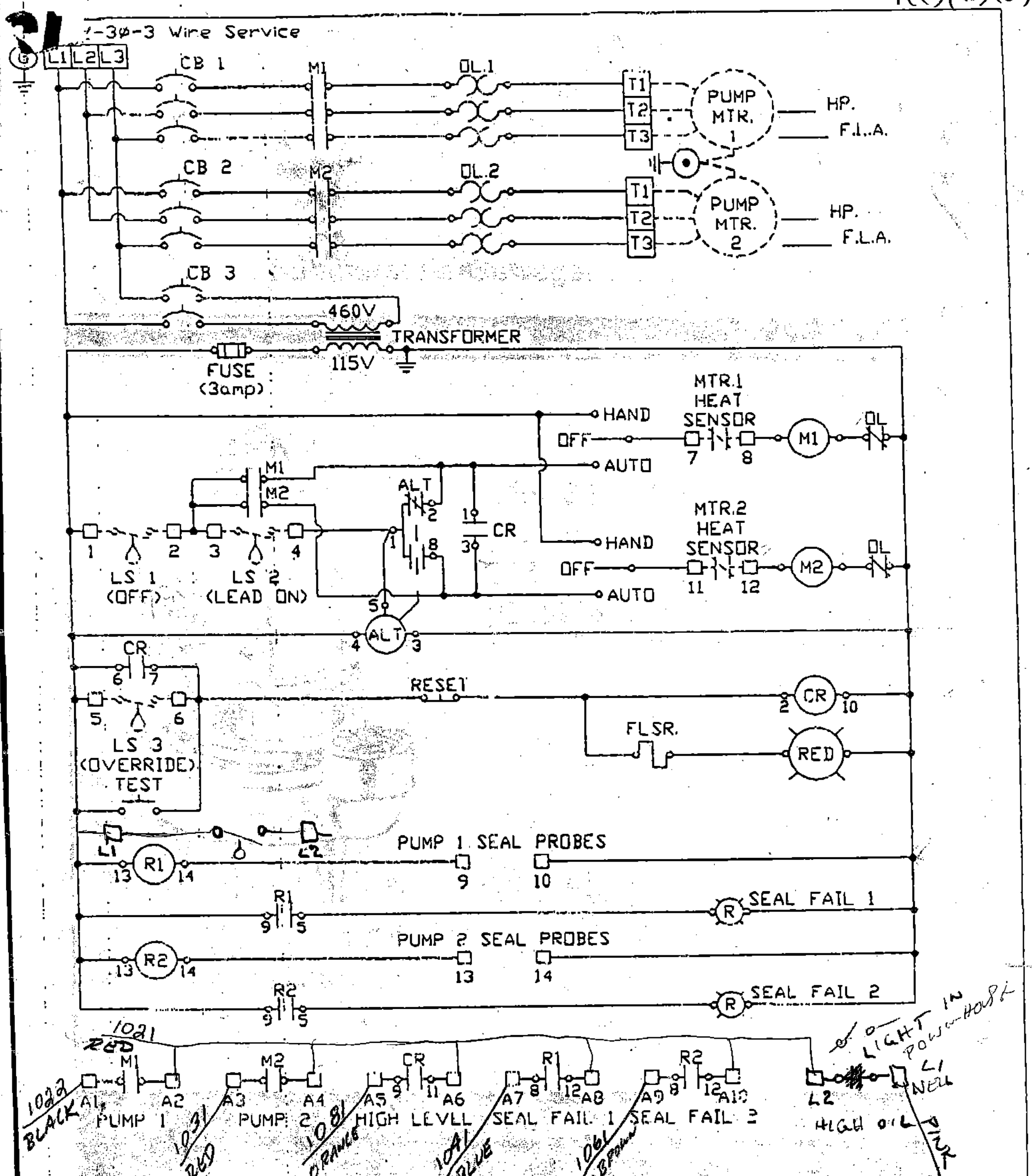
E. HEALTH & SAFETY ITEMS

F. TEST/SURVEY RESULTS
- COMPACTION
- FINAL GRADES (OCT '97) AT BIOCELL/LAGOON NO 1.
- DISCHARGE LINE

G. OTHER ITEMS

CDF007004

1(c)(d)(e)



Switches Must Be Rated A Minimum Of 2 Amps @ 120 Volts.
All White Field Wiring Terminals To 20 In.Lbs.
Wiring Must Be 60°C Copper Wire Minimum.
--- = Items Not Supplied In Panel

DRWN.	DATE	Chandler Systems, Inc.	
TAD	11/20/95		
CHKD.	DATE	SCALE	DRWG. NO.
		NONE	A-MACK14

CDF007005

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Canton Drop Forge
Wastewater Investigations

P.O. Number	Parsons ES Project No.	Description
098252	731549 01000	Wastewater Treatment/Recycling Investigation--Samples of HPS blowdown, boiler feed water, and condensate tank drainage were collected and analyzed for oil & grease and other parameters. Various methods of removing oil & grease from the condensate were tested. Methods which appeared to be applicable based on the testing were membrane filtration and conventional filtration. Parsons ES recommended further testing of cartridge filters as the most cost effective alternative. Beneficial Results--This study verified that membrane filtration is capable of removing oil and grease from the condensate and suggested that the simpler and lower cost option of cartridge filtration would also work.
098623	731549 02000	Condensate Filtration Testing--Parsons ES used a temporary installation to test the performance of cartridge filters on the condensate tank drainage. The tests revealed that filters of 1 and 10 micron pore-size removed very little oil & grease and suspended solids. During the testing the oil & grease concentration in the condensate was found to be approximately 50 mg/l and the flow rate was estimated at 0.4 to 1.0 gpm. Beneficial Results--The test showed that cartridge filtration did not produce satisfactory results. However, the low flows and low oil and grease concentrations encountered during the test, suggested that discharge to the sanitary sewer with further treatment is a viable option.

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PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119
PARESCL/997/Dea/MRL4-44

23 September 1997

Post-it® Fax Note 7671	Date 9/23/97	# of pages ▶ 3
To K. Houseknecht	From M LEFFLER	
Co./Dept. CDF	Co. Parsons ES	
Phone #	Phone # 216 486 9005	
Fax # 330-477-2046	Fax # 216 486 6119	

972400 97003

Mr. Keith Houseknecht
Manager, Plant Engineering
CANTON DROP FORGE, INC.
4575 Southway Street
Canton, Ohio 44706

Subject: Control of Miscellaneous Oil Discharges

Dear Mr. Houseknecht:

Introduction

Per your recent conversation with Ed Karkalik, Parsons Engineering Science (Parsons ES) is pleased to submit this proposal to investigate the various water streams discharging to the on-site ponds and make recommendations to reduce or eliminate the potential for oil contamination.

Project Understanding

Surface drainage and various water streams from the manufacturing facilities discharge to a series of three ponds located on the Canton Drop Forge (CDF) site. Canton Drop Forge is presently in the process of reconditioning these ponds, and would like to take measures to prevent the future discharge of oil contaminated waters to these ponds. In the present configuration, Pond 1 receives mostly rain water run-off from the west end of the facility as well as the storm water overflow from the oil/water separator. The collected water is pumped through the in-plant sewer to Pond 2.

Pond 2 receives the flow from Pond 1 and other discharges to the in-plant sewer along with surface water drainage from the central area of the facility. Other discharges to the in-plant sewer include overflow from the cooling tower sump, condensate from the condensate tank (including condensate from the low pressure steam separator, the hot process softener separator, and the anvil heating lines), condensate from steam unit heaters located throughout the facility, discharge from the oil/water separator on the forge area drains, and the scrubber water overflow from the coal-fired boiler scrubber system. Water from Pond 2 is pumped to Pond 3.

Pond 3 receives the pumped flow from Pond 2 and the surface run-off from the extreme eastern end of the facility.

Parsons ES will review the various discharges to the ponds (focusing attention on Pond 2 influents) and will make recommendations to minimize or eliminate the potential for discharge of oil to the ponds. The main objective of the study will be to identify procedural changes and low-cost capital expenditures to achieve CDF's goals. It is anticipated that the review and recommendations will include elements of a storm water pollution prevention plan (SWPPP), an oil spill prevention control and countermeasure (SPCC) plan and a pollution prevention (P2) program as well as simple pre-treatment techniques such as gravity oil/water separation.

PARSONS

It is not the intent of this study to recommend further treatability studies or treatment system designs. Treatment techniques contemplated are limited to strategic placement of oil/water separators and/or simple oil traps.

Scope of Work

Site Survey

Parsons ES will visit the Canton Drop Forge site to conduct an in-depth review of the discharges to the in-plant sewer system and potential sources of oil contamination of storm water. Parsons ES has already collected considerable information regarding the discharges to the sewer and facility drainage. This survey will be a systematic review of the sewer discharges and potential storm water discharges to assure that all sources are considered. The on-site review will concentrate on the physical arrangement of facilities and sewer connections so that the most efficient means of eliminating or intercepting potential sources can be considered.

Report

Parsons ES will prepare a letter presenting the results of the study. The report will include:

- Identification of potential sources;
- Review of options to reduce or eliminate oil discharges; and
- Recommendations.

It is anticipated that recommendations will include:

- Recommended Best Management Practices (BMPs) to reduce oil contamination of site drainage and discharges to the in-plant sewer;
- Recommendations for secondary containment of oil containing tanks if applicable;
- Recommendations for oil traps on condensate discharge lines from unit heaters; and
- other low-cost measures to minimize the discharge of oil.

Project Schedule

Parsons ES will complete the proposed scope of work within one month of notice to proceed.

Compensation

Parsons ES proposes to perform the services offered in this proposal for a lump sum price of $5,000. Other terms and conditions will be in accordance with our previously submitted (11 April 1997) Engineering Services Agreement (ESA). Parsons ES will not invoice Canton Drop Forge for more than $5,000 without further authorization.

Mr. Keith Houseknecht, Mgr., Plt. Engineering
CANTON DROP FORGE, INC.
23 September 1997
Page 3- Dee/MRL4-44

This lump sum price is based on a level of effort which includes 40 hours of engineering (including one day for the on-site investigation) plus drafting, support services and other direct costs.

If this proposal is acceptable to you, please issue a purchase order referencing this proposal and our ESA. This will serve as our authorization to proceed. Thank you for the opportunity to present this proposal.

If you have any questions or wish to discuss this proposal, please do not hesitate to call.

Very truly yours,

PARSONS ENGINEERING SCIENCE

Wilson H. Rownd, P.E.
Vice President/Manager

Michael R. Leffler, P.E.
Associate

WHR/MRL/dec
cc: CMB (File)

PARSONS ENGINEERING SCIENCE, INC.
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23 September 1997

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SEP 24 1997
CANTON DROP FORGE

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Canton, Ohio 44706

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SEP 24 1997

CANTON DROP FORGE

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Very truly yours,

PARSONS ENGINEERING SCIENCE

Wilson H. Rownd, P.E.
Vice President/Manager

Michael R. Leffler, P.E.
Associate

WHR/MRL/dee
cc: CMB (File)

KJH okay JPD 2(b) 3

PARSONS ENGINEERING SCIENCE, INC.
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PARESCL/897/Dee/EJK7-20

SCHEDULE FOR SAM

22 August 1997

Jerry with your approval I will start a P.O. addendum Keith 8/22/97

Per Jerry w/ ED to reduce

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Lagoon No. 1 Reconstruction Project

Dear Keith:

Confirming our telephone conversation yesterday (21 August 1997), Parsons Engineering Science, Inc. (Parsons ES) proposes, and Canton Drop Forge, Inc. (CDF) concurs, that the scope and budget for the above-referenced project be increased to cover the incremental activities, hours and expenses incurred by Parsons ES in assisting CDF in negotiating a construction contract with The Beaver Excavating Company (Beaver). This change is consistent with previous discussions, conducted in a telephone conversation with Mr. Bill Price on 22 July 1997, and our letter to Mr. Jerry Bressanelli, dated 25 July 1997, on the same subject. As you will recall, this change became necessary following receipt and opening of the bids for this project; initial analysis of the bids indicated that the three bidders had been "non-responsive", albeit in three different ways.

As you are aware, several iterations, discussions by telephone and in meetings, facsimiles and related efforts have since ensued to analyze Beaver's bid in sufficient levels of detail and to negotiate the scope and corresponding price to that which is appropriate to the work. As a result of these activities during the period from 28 July 1997 to 18 August 1997, a more realistic scope and affordable bid price were evolved for the proposed construction efforts. In securing these results, Parsons ES provided 37.5 hours of support activity, as compared with 3 hours of labor originally proposed (see Task 4 in our 13 June 1997 proposal). The impact of this change is an increased cost of $2,753 for labor. Additionally, a corresponding cost of $134 for other direct costs (ODCs), originally budgeted at $20, was incurred. Thus the total impact of these changes is $2,867. Attachment 1 provides a more detailed look at these costs.

In accordance with our discussion, please issue an addendum (or change order) to CDF's Purchase Order for this project (PO No. 98575).

KH 1104

In our telephone conversation yesterday, we also discussed the possible impacts of Beaver's extended schedule on the construction observation task which is about to commence. As indicated in our proposal (see Task 5), we proposed to provide a level of effort (80 hours) for this activity, with the intent that critical stages in the work would be observed by our personnel. The original timetable projected for completing the construction phase of this project was 4 weeks; Beaver is now projecting a period of 8-10 weeks. This extension may require a corresponding expansion of the amount of time that our (or your) observers are on-site monitoring Beaver's

Jerry - This seems to be well documented & justified 8/25/97 KH construction progress and compliance with the project design and specifications. As agreed, we will have a much better idea of the significance of this change after we review Beaver's proposed schedule, expected to be received during the Pre-Construction Meeting scheduled for today (22 August 1997), and will then have the opportunity to plan accordingly.

We look forward to continuing to be of service to Canton Drop Forge in this and any other environmental service requirements.

Very truly yours,

PARSONS ENGINEERING SCIENCE, INC.

Wilson H. Rownd, P.E.
Vice President/Manager

Ed Karkalik

Edward J. Karkalik, P.E.
Project Manager

EJK/dee
cc: CMB (File 73139703000)

ATTACHMENT 1

CANTON DROP FORGE, INC.

LAGOON NO. 1 RE-CONSTRUCTION PROJECT

Task 4: Complete Contracting Documents

LABOR

Individual	Original Budget	Actual Effort
Ed Karkalik (Project Management)	1 hr	15 hr
Gordon Melle (Technical Review)	0	4
Carol Bowers (Administration)	0	0.5
Beth McCartney (Engineering)	0	16
Dee Collins (Word Processing)	2	1.5
Dana Bond (Administration)	0	0.5
TOTALS	3 hrs.	37.5 hr.
LABOR COST	$202	$2,955

ODCs

Telephone	$0	$10
Facsimile	0	14
Postage	0	0
Mileage	0	95
Computer	20	15
TOTALS	$20	$134
ODC COST	$20	$134
GRAND TOTALS	$222	$3,089
INCREMENTAL COSTS		$2,867

2 (b)
3

PARSONS ENGINEERING SCIENCE, INC.

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

DATE: 15 SEPT 1997

TO: MARK HADAR
LOCATION: FOUR SEASONS ENVIRONMENTAL
RAPIDFAX NO.: 517-669-7184
COPIES TO: KEITH HOUSEKNECHT
330-477-2046

FROM: ED KARKALIK

TOTAL NUMBER OF PAGES 1 (including this cover letter)

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL BACK AS SOON AS POSSIBLE.

We are herewith transmitting the following:

DATE	NO.	DESCRIPTION

MARK —

THANKS FOR YOUR CALL-BACK THIS MORNING. CONFIRMING OUR DISCUSSIONS, ANY INFORMATION WHICH CAN BE PROVIDED BY 10/1/97 WOULD BE HELPFUL AND APPRECIATED. WE ARE NOT EXPECTING THIS TO BE A MAJOR, EXPENSIVE, TIME-CONSUMING EXERCISE. ALL WE HOPE TO FIND OUT ARE:

1. IS IT TECHNICALLY AND ECONOMICALLY FEASIBLE TO STABILIZE / SOLIDIFY THE MATERIAL (TO AN CBR OF 5)?
2. WHAT ARE THE BUDGETARY COSTS?
3. IS FOUR SEASONS QUALIFIED / CAPABLE / INTERESTED IN BEING CONSIDERED FOR THIS WORK?

ITEM #3 INCLUDES LOGISTICS, MANPOWER AVAILABILITY, EXPERIENCE, ETC. AND CAN PROBABLY BE ADDRESSED BY A QUALS PACKAGE AND LIST OF REFERENCES

ED

JOB NO. 73397.04000

02000C02

CDF007016

Designation: D 1883 – 87$^{\epsilon 1}$

Standard Test Method for CBR (California Bearing Ratio) of Laboratory-Compacted Soils[1]

This standard is issued under the fixed designation D 1883; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

$^{\epsilon 1}$ NOTE—Editorial changes were made to 1.4 and Fig. X1.1 and Section 12 was added editorially in August 1988.

1. Scope

1.1 This test method covers the determination of the CBR (California Bearing Ratio) of pavement subgrade, subbase, and base/course materials from laboratory compacted specimens. The test method is primarily intended for but not limited to, evaluating the strength of cohesive materials having maximum particle sizes less than ¾ in. (19 mm).

1.2 When materials having maximum particle sizes greater than ¾ in. (19 mm) are to be tested, this test method provides for modifying the gradation of the material so that the material used for tests all passes the ¾-in. sieve while the total gravel (+No. 4 to 3 in.) fraction remains the same. While traditionally this method of specimen preparation has been used to avoid the error inherent in testing materials containing large particles in the CBR test apparatus, the modified material may have significantly different strength properties than the original material. However, a large experience base has developed using this test method for materials for which the gradation has been modified, and satisfactory design methods are in use based on the results of tests using this procedure.

1.3 Past practice has shown that CBR results for those materials having substantial percentages of particles retained on the No. 4 sieve are more variable than for finer materials. Consequently, more trials may be required for these materials to establish a reliable CBR.

1.4 This test method provides for the determination of the CBR of a material at optimum water content or a range of water content from a specified compaction test and a specified dry unit weight. The dry unit weight is usually given as a percentage of maximum dry unit weight from the compaction tests of Test Methods D 698 or D 1557.

1.5 The agency requesting the test shall specify the water content or range of water content and the dry unit weight for which the CBR is desired.

1.6 Unless specified otherwise by the requesting agency, or unless it has been shown to have no effect on test results for the material being tested, all specimens shall be soaked prior to penetration.

1.7 For the determination of CBR of field compacted materials, see Test Method D 4429.

1.8 The values stated in inch-pound units are to be regarded as the standard. The SI equivalents shown in parentheses may be approximate.

1.9 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 422 Method for Particle-Size Analysis of Soils[2]
D 698 Test Methods for Moisture-Density Relations of Soils and Soil Aggregate Mixtures using 5.5-lb (2.49-kg) Rammer and 12-in. (305-mm) Drop[2]
D 1557 Test Methods for Moisture-Density Relations of Soils and Soil Aggregate Mixtures using 10-lb (4.54-kg) Rammer and 18-in (457-mm) Drop[2]
D 2168 Methods for Calibration of Laboratory Mechanical-Rammer Soil Compactors[2]
D 2216 Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil Aggregate Mixtures[2]
D 2487 Test Method for Classification of Soils for Engineering Purposes[2]
D 2488 Practice for Description and Identification of Soils (Visual-Manual Procedure)[2]
D 4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils[2]
D 4429 Test Method for Bearing Ratio of Soils In Place[2]
E 11 Specification for Wire-Cloth Sieves for Testing Purposes[3]

3. Significance and Use

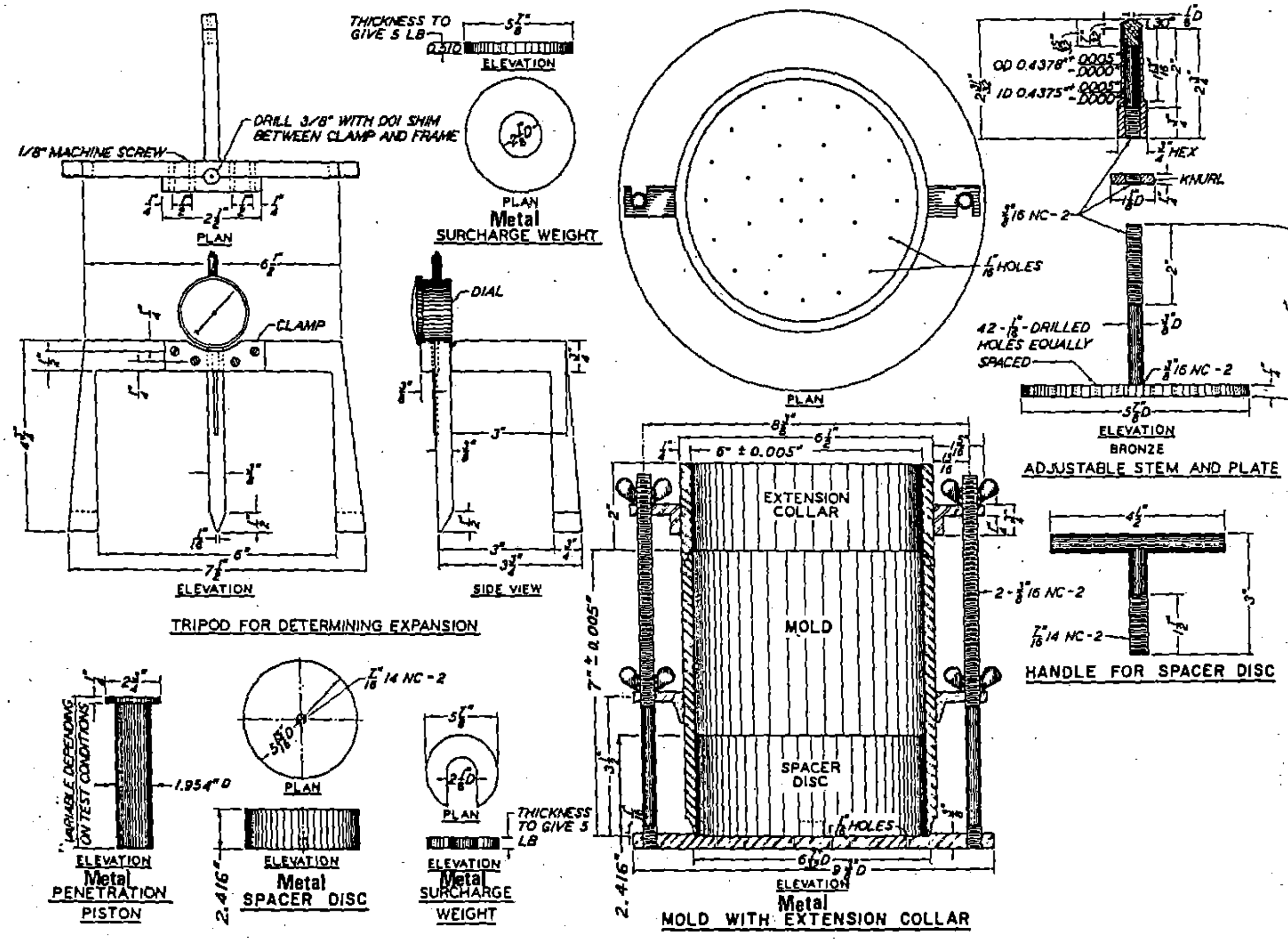
3.1 This test method is used to evaluate the potential strength of subgrade, subbase, and base course material, including recycled materials for use in road and airfield pavements. The CBR value obtained in this test forms an

[1] This test method is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.08 on Special and Construction Control Tests.

Current edition approved Aug. 28, 1987. Published October 1987. Originally published as D 1883 – 61T. Last previous edition D 1883 – 73 (1978).

[2] *Annual Book of ASTM Standards*, Vol 04.08.

[3] *Annual Book of ASTM Standards*, Vols 04.01, 04.06, and 14.02.



NOTE—See Table 1 for metric equivalents.

FIG. 1 Bearing Ratio Test Apparatus

integral part of several flexible pavement design methods.

3.2 For applications where the effect of compaction water content on CBR is small, such as cohesionless, coarse-grained materials, or where an allowance is made for the effect of differing compaction water contents in the design procedure, the CBR may be determined at the optimum water content of a specified compaction effort. The dry unit weight specified is normally the minimum percent compaction allowed by the using agency's field compaction specification.

3.3 For applications where the effect of compaction water content on CBR is unknown or where it is desired to account for its effect, the CBR is determined for a range of water content, usually the range of water content permitted for field compaction by using agency's field compaction specification.

3.4 The criteria for test specimen preparation of self cementing (and other) materials which gain strength with time must be based on a geotechnical engineering evaluation. As directed by the engineer, self cementing materials shall be properly cured until bearing ratios representing long term service conditions can be measured.

4. Summary of Method

4.1 For tests performed on materials compacted to one water content, three specimens are prepared. The specimens are compacted using three different compactive efforts to obtain unit weights both above and below the desired unit weight. After allowing specimens to take on water by soaking, or other specified treatment such as curing, each specimen is subjected to penetration by a cylindrical rod. Results of stress (load) versus penetration depth are plotted to determine the CBR for each specimen. The CBR at the specified density is determined from a graph of CBR versus dry unit weight.

4.2 For tests in which the result is to be determined for a water content range, a series of specimens at each of three compactive efforts are prepared over the range of water content of interest. The compactive efforts are chosen to produce unit weights above and below the desired unit weight. After allowing the specimens to take on water by soaking, or other specified treatment such as curing, each specimen is penetrated. Results are plotted to obtain the

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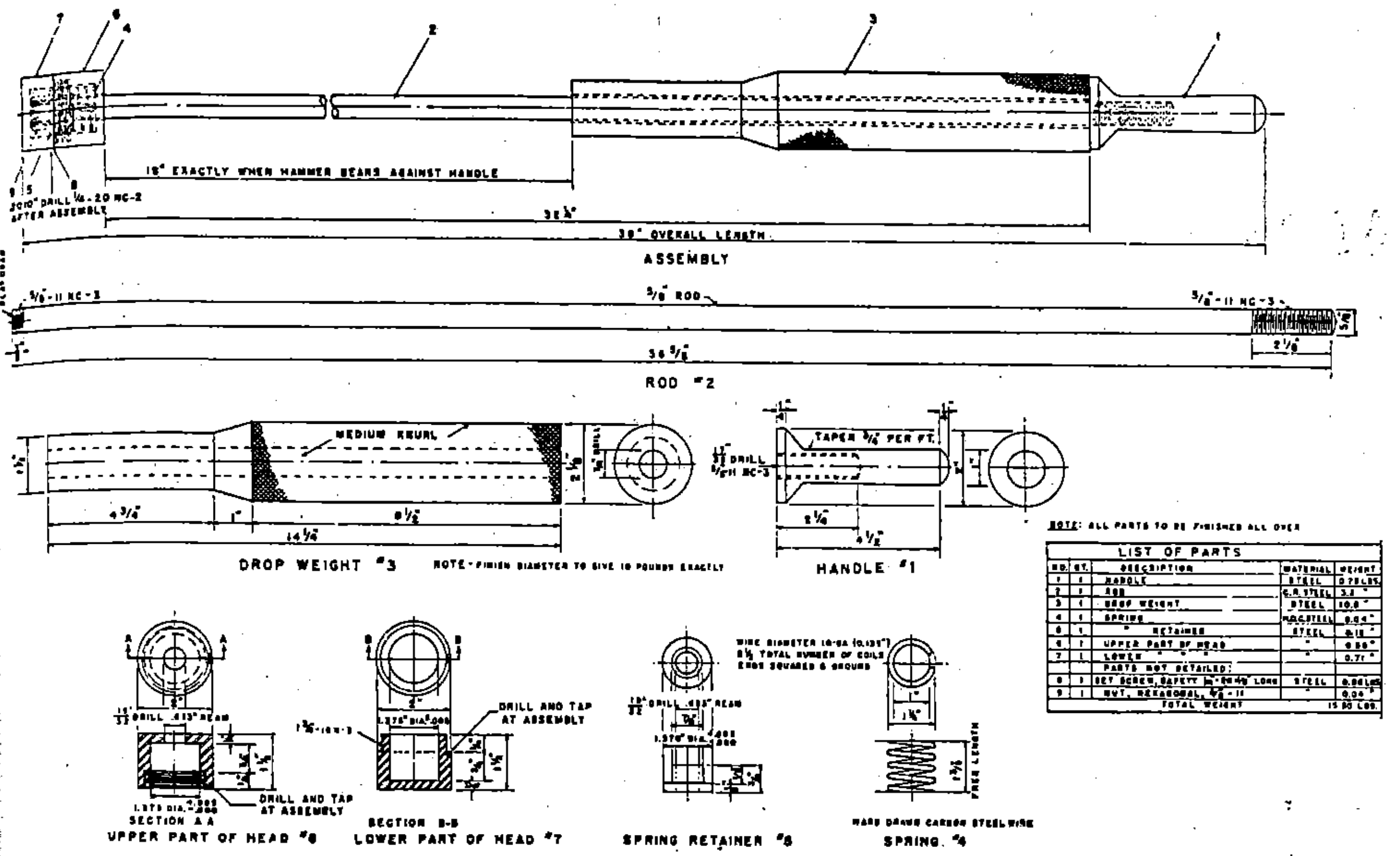


NOTE—See Table 1 for metric equivalents.

FIG. 2 Sliding Weight Rammer—Assembly and Details

CBR for each specimen. A plot of CBR versus unit weight for each water content is made to determine the minimum CBR for the water content range of interest.

5. Apparatus

5.1 *Loading Machine*—A loading machine with a capacity of at least 10 000 lbf (44.5 kN) and equipped with a movable head or base that travels at a uniform (not pulsating) rate of 0.05 in. (1.27 mm)/min. for use in forcing the penetration piston into the specimen. The machine shall be equipped with a load-indicating device that can be read to 10 lbf (44 N) or less.

5.2 *Mold*—The mold shall be a rigid metal cylinder with an inside diameter of 6 ± 0.026 in. (152.4 ± 0.66 mm) and a height of 7 ± 0.018 in. (177.8 ± 0.46 mm). It shall be provided with a metal extension collar at least 2.0 in. (50.8 mm) in height and a metal base plate having at least twenty eight 1/16-in. (1.59-mm) diameter holes uniformly spaced over the plate within the inside circumference of the mold. When assembled with spacer disc in place in the bottom of the mold, the mold shall have an internal volume (excluding extension collar) of 0.075 ± 0.0009 ft (2124 ± 25 cm). Figure 1 shows a satisfactory mold design. A calibration procedure should be used to confirm the actual volume of the mold with the spacer disk inserted. Suitable calibrations are contained in Test Methods D 698 and Test Methods D 1557.

5.3 *Spacer Disk*—A circular metal spacer disc (see Fig. 1) having a minimum outside diameter of 5 15/16 in. (150.8 mm) but no greater than will allow the spacer to easily slip into the mold. The spacer disc shall be 2.416 ± 0.005 in. (61.37 ± 0.127 mm) in height.

5.4 *Rammer*—A rammer as specified in either Test Methods D 698 or Test Methods D 1557 except that if a mechanical rammer is used it must be equipped with a circular foot, and when so equipped, must provide a means for distributing the rammer blows uniformly over the surface of the soil when compacting in a 6-in. (152.4-mm) diameter mold. The mechanical rammer must be calibrated and adjusted in accordance with Methods D 2168. A sliding weight rammer of the type shown in Fig. 2 may be substituted for the rammer described in Test Methods D 1557, provided use of the rammer is specified by the agency requesting the test, and the results obtained are the same as those given by the rammer described in Test Methods D 1557.

5.5 *Expansion-Measuring Apparatus*—An adjustable metal stem and perforated metal plate, similar in configuration to that shown in Fig. 1. The perforated plate shall be 5 7/8 to 5 15/16 in. (149.23 to 150.81 mm) in diameter and have at least forty two 1/16-in. (1.59-mm) diameter holes uniformly spaced over the plate. A metal tripod to support the dial gage for measuring the amount of swell during soaking is also required.

5.6 *Weights*—One or two annular metal weights having a total mass of 4.54 ± 0.02 kg and slotted metal weights each having masses of 2.27 ± 0.02 kg. The annular weight shall be 5 7/8 to 5 15/16 in. (149.23 to 150.81 mm) in diameter and shall have a center hole of approximately 2 1/8 in. (53.98 mm).

STAN
WHEN TO PAS HRGO
FLANGES

INSULATION - BELOW GRADE?
VALVE LINE FROM DISCHARGE SIDE
FLOAT
BELL REDUCER 4X3 ON SUCTION
CONCENTRIC SHOULD BE
ECCENTRIC

HOW WILL SUCTION BE EVACUATED
DURING WINTER?
RE~~PLACE~~ WELD SUCTION LINE
RE WELD / POSITION SUCTION VALVE (HOR)

NEED TO WRITE LETTER TO ED
& CONT RICK (WITH ADDITION INFO)

TABLE 1 Metric Equivalents

Inch-Pound Units, in.	Metric Equivalent, mm	Inch-Pound Units, in.	Metric Equivalent, mm	Inch-Pound Units, in.	Metric Equivalent, mm
0.003	0.076	$\frac{19}{32}$	15.08	$3\frac{1}{2}$	88.90
0.005	0.127	$\frac{5}{8}$	15.88	$3\frac{3}{4}$	95.25
0.135	3.43	$\frac{3}{4}$	19.10	$4\frac{1}{4}$	108.0
0.201	5.11	$\frac{15}{16}$	23.81	$4\frac{1}{2}$	114.3
0.4375	11.11	1	25.40	$4\frac{3}{4}$	120.7
0.4378	11.12	$1\frac{1}{8}$	28.58	$5\frac{7}{8}$	149.2
0.510	12.95	$1\frac{1}{4}$	31.8	$5\frac{15}{16}$	150.8
0.633	16.08	$1\frac{3}{8}$	34.9	6	152.0
1.370	34.60	$1\frac{1}{2}$	38.10	$6\frac{7}{32}$	158.0
1.375	34.93	$1\frac{3}{4}$	44.5	$6\frac{1}{2}$	165.1
1.954	49.63	$1\frac{13}{16}$	46.04	7	177.8
2.416	61.37	$1\frac{15}{16}$	49.21	$7\frac{1}{2}$	190.1
$\frac{1}{16}$	1.59	2	50.80	$8\frac{3}{8}$	212.7
$\frac{7}{32}$	5.56	$2\frac{1}{8}$	53.98	$8\frac{1}{2}$	215.9
$\frac{1}{4}$	6.35	$2\frac{1}{5}$	55.9	$9\frac{3}{8}$	238.1
$\frac{3}{8}$	9.53	$2\frac{1}{4}$	57.2	$14\frac{1}{4}$	362.0
$\frac{7}{16}$	11.11	$2\frac{1}{2}$	63.50	18	457.2
$\frac{15}{32}$	11.91	$2\frac{3}{4}$	69.85	$32\frac{1}{4}$	719.2
$\frac{1}{2}$	12.70	$2\frac{31}{32}$	75.41	$36\frac{5}{8}$	930.3
$\frac{17}{32}$	13.49	3	76.20	39	990.6

Inch-Pound Units, lb	Metric Equivalent, kg	Inch-Pound Units, psi	Metric Equivalent, MPa
0.04	0.02	200	1.4
0.05	0.02	400	2.8
0.12	0.05	600	4.1
0.59	0.27	800	5.5
0.71	0.32	1000	6.9
0.75	0.34	1200	8.3
3.20	1.45	1400	9.7
5.00	2.27		
10.00	4.54		

5.7 *Penetration Piston*—A metal piston 1.954 ± 0.005 in. (49.63 ± 0.13 mm) in diameter and not less than 4 in. (101.6 mm) long (see Fig. 1). If, from an operational standpoint, it is advantageous to use a piston of greater length, the longer piston may be used.

5.8 *Gages*—Two dial gages reading to 0.001 in. (0.025 mm) with a range of 0.200 minimum.

5.9 *Miscellaneous Apparatus*—Other general apparatus such as a mixing bowl, straightedge, scales, soaking tank or pan, oven, fast filtering high wet strength filter paper, dishes, and 2-in., ¾-in. and No. 4 sieves.

6. Sample

6.1 The sample shall be handled and specimen(s) for compaction shall be prepared in accordance with the procedures given in Test Methods D 698 or D 1557 for compaction in a 6-in. (152.4-mm) mold except as follows:

6.1.1 If all material passes a ¾-in. (19-mm) sieve, the entire gradation shall be used for preparing specimens for compaction without modification. If there is material retained on the ¾-in. (19-mm) sieve, the material retained on the ¾-in. (19-mm) sieve shall be removed and replaced by an equal amount of material passing the ¾-in. (19-mm) sieve and retained on the No. 4 sieve obtained by separation from portions of the sample not otherwise used for testing.

7. Test Specimens

7.1 *Bearing Ratio at Optimum Water Content Only*—Using material prepared as described in 6.1, conduct a control compaction test with a sufficient number of test specimens to definitely establish the optimum water content for the soil using the compaction method specified, either Test Methods D 698 or D 1557. A previously performed compaction test on the same material may be substituted for the compaction test just described, provided that if the sample contains material retained on the ¾-in. (19-mm) sieve, soil prepared as described in 6.1 is used (Note 1).

NOTE 1—Maximum dry unit weight obtained from a compaction test performed in a 4-in. (101.6-mm) diameter mold may be slightly greater than the maximum dry unit weight obtained from compaction in the 6-in. (152.4-mm) compaction mold or CBR mold.

7.1.1 For cases where the CBR is desired at 100 % maximum dry unit weight and optimum water content, compact a specimen using the specified compaction procedure, either Test Methods D 698 or Test Methods D 1557, from soil prepared to within ±0.5 percentage point of optimum water content.

NOTE 2—Where the maximum dry unit weight was determined from compaction in the 4-in. (101.6-mm) mold, it may be necessary to compact specimens as described in 7.3, using 75 blows per layer or some other value sufficient to produce a specimen having a density equal to or greater than that required.

7.1.2 Where the CBR is desired at optimum water content and some percentage of maximum dry unit weight, compact three specimens from soil prepared to within ±0.5 percentage point of optimum water content and using the specified compaction but using a different number of blows per layer for each specimen. The number of blows per layer shall be varied as necessary to prepare specimens having unit weights above and below the desired value. Typically, if the CBR for soil at 95 % of maximum dry unit is desired, specimens compacted using 56, 25, and 10 blows per layer is satisfactory. Penetration shall be performed on each of these specimens.

7.2 *Bearing Ratio for a Range of Water Content*—Prepare specimens in a manner similar to that described in 7.1 except that each specimen used to develop the compaction curve shall be penetrated. In addition, the complete water content-unit weight relation for the 25-blow and 10-blow per layer compactions shall be developed and each test specimen compacted shall be penetrated. Perform all compaction in the CBR mold. In cases where the specified unit weight is at or near 100 % maximum dry unit weight, it will be necessary to include a compactive effort greater than 56-blows per layer (Note 3).

NOTE 3—A semilog log plot of dry unit weight versus compactive effort usually gives a straight line relation when compactive effort in ft-lb/ft^3 is plotted on the log scale. This type of plot is useful in establishing the compactive effort and number of blows per layer needed to bracket the specified dry unit weight and water content range.

7.2.1 If the sample is to be soaked, take a representative sample of the material, for the determination of moisture, at the beginning of compaction and another sample of the remaining material after compaction. Use Method D 2216 to determine the moisture content. If the sample is not to be soaked, take a moisture content sample in accordance with Test Methods D 698 or Test Methods D 1557 if the average moisture content is desired.

7.2.2 Clamp the mold (with extension collar attached) to the base plate with the hole for the extraction handle facing down. Insert the spacer disk over the base plate and place a disk of filter paper on top of the spacer disk. Compact the soil-water mixture into the mold in accordance with 7.1, 7.1.1, or 7.1.2.

7.2.3 Remove the extension collar and carefully trim the compacted soil even with the top of the mold by means of a straightedge. Patch with smaller size material any holes that may have developed in the surface by the removal of coarse material. Remove the perforated base plate and spacer disk, weigh, and record the mass of the mold plus compacted soil. Place a disk of coarse filter paper on the perforated base plate, invert the mold and compacted soil, and clamp the perforated base plate to the mold with compacted soil in contact with the filter paper.

7.2.4 Place the surcharge weights on the perforated plate and adjustable stem assembly and carefully lower onto the compacted soil specimen in the mold. Apply a surcharge equal to the weight of the base material and pavement within 2.27 kg (5 lb), but in no case shall the total weight used be less than 4.54 kg (10 lb). If no pavement weight is specified, use 4.54 kg. Immerse the mold and weights in water allowing free access of water to the top and bottom of the specimen. Take initial measurements for swell and allow the specimen to soak for 96 h. Maintain a constant water level during this period. A shorter immersion period is permissible for fine grained soils or granular soils that take up moisture readily, if tests show that the shorter period does not affect the results. At the end of 96 h, take final swell measurements and calculate the swell as a percentage of the initial height of the specimen.

7.2.5 Remove the free water and allow the specimen to drain downward for 15 min. Take care not to disturb the surface of the specimen during the removal of the water. It may be necessary to tilt the specimen in order to remove the surface water. Remove the weights, perforated plate, and filter paper, and determine and record the mass.

8. Procedure for Bearing Test

8.1 Place a surcharge of weights on the specimen sufficient to produce an intensity of loading equal to the weight of the base material. If no pavement weight is specified, use 4.54 kg mass. If the specimen has been soaked previously, the surcharge shall be equal to that used during the soaking period. To prevent upheaval of soil into the hole of the surcharge weights, place the 2.27 kg annular weight on the soil surface prior to seating the penetration piston, after which place the remainder of the surcharge weights.

8.2 Seat the penetration piston with the smallest possible load, but in no case in excess of 10 lbf (44 N). Set both the stress and penetration gages to zero. This initial load is required to ensure satisfactory seating of the piston and shall be considered as the zero load when determining the load penetration relation. Anchor the strain gage to the load measuring device, if possible; in no case attach it to the testing machines support bars (legs).

NOTE 4—At high loads the supports may torque and affect the reading of the penetration gage. Checking the depth of piston penetration is one means of checking for erroneous strain indications.

8.3 Apply the load on the penetration piston so that the rate of penetration is approximately 0.05 in. (1.27 mm)/min. Record the load readings at penetrations of 0.025 in. (0.64 mm), 0.050 in. (1.27 mm), 0.075 in. (1.91 mm), 0.100 in. (2.54 mm), 0.125 in. (3.18 mm), 0.150 in. (3.81 mm), 0.175 in. (4.45 mm), 0.200 in. (5.08 mm), 0.300 in. (7.62 mm), 0.400 in. (10.16 mm) and 0.500 in. (12.70 mm). Note the maximum load and penetration if it occurs for a penetration of less than 0.500 in. (12.70 mm). With manually operated loading devices, it may be necessary to take load readings at closer intervals to control the rate of penetration. Measure the depth of piston penetration into the soil by putting a ruler into the indentation and measuring the difference from the top of the soil to the bottom of the indentation. If the depth does not closely match the depth of penetration gage, determine the cause and test a new sample.

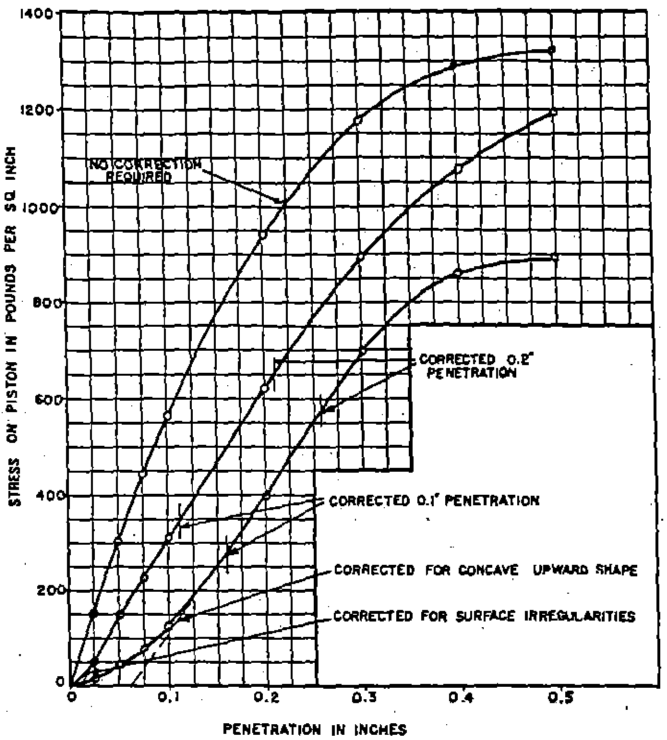
8.4 Remove the soil from the mold and determine the moisture content of the top 1-in. (25.4-mm) layer. Take a moisture content sample in accordance with Test Methods D 698 or Test Methods D 1557 if the average moisture content is desired. Each moisture content sample shall weigh not less than 100 g for fine-grained soils nor less than 500 g for granular soils.

NOTE 5—The load readings at penetrations of over 0.300 in. (7.6 mm) may be omitted if the testing machine's capacity has been reached.

9. Calculations

9.1 *Load-Penetration Curve*—Calculate the penetration stress in pounds per square inch or megapascals and plot the stress-penetration curve. In some instances, the stress-penetration curve may be concave upward initially, because of surface irregularities or other causes, and in such cases the zero point shall be adjusted as shown in Fig. 3.

9.2 *Bearing Ratio*—Using corrected stress values taken from the stress penetration curve for 0.100 in. (2.54 mm) and 0.200 in. (5.08 mm) penetrations, calculate the bearing



NOTE—See Table 1 for metric equivalents.

FIG. 3 Correction of Load-Penetration Curves

ratios for each by dividing the corrected stresses by the standard stresses of 1000 psi (6.9 MPa) and 1500 psi (10.3 MPa) respectively, and multiplying by 100. Also, calculate the bearing ratios for the maximum stress, if the penetration is less than 0.200 in. (5.08 mm) interpolating the standard stress. The bearing ratio reported for the soil is normally the one at 0.100 in. (2.54 mm) penetration. When the ratio at 0.200 in. (5.08 mm) penetration is greater, rerun the test. If the check test gives a similar result, use the bearing ratio at 0.200 in. (5.08 mm) penetration.

NOTE 6—If bearing ratio values at penetrations of 0.300 (7.62 mm), 0.400 (10.16 mm) and 0.500 in. (12.7 mm) are desired, the corrected stress values of these penetrations should be divided by the standard stresses of 1900 psi (13.1 MPa), 2300 psi (15.9 MPa), 2600 psi (17.9 MPa), respectively, and multiplied by 100.

9.3 *Design CBR for One Water Content Only*—Using the data obtained from the three specimens, plot the CBR versus molded dry unit weight relation as illustrated in Fig. 4. Determine the design CBR at the percentage of the maximum dry unit weight requested.

9.4 *Design CBR for Water Content Range*—Plot the data from the tests at the three compactive efforts as shown in Fig. 5. The data plotted as shown represents the response of the soil over the range of water content specified. Select the CBR for reporting as the lowest CBR within the specified water content range having a dry unit weight between the specified minimum and the dry unit weight produced by compaction within the water content range.

10. Report

10.1 The report shall include the following:

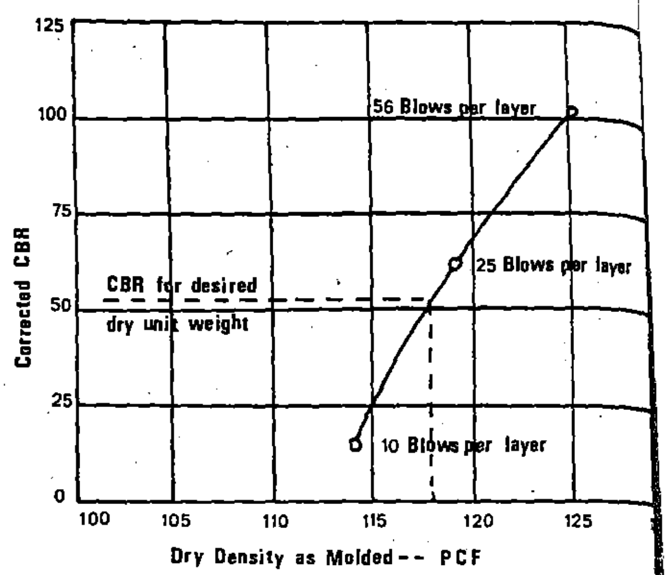


FIG. 4 Dry Density Versus CBR

10.1.1 Method used for preparation and compaction of specimen: Test Methods D 698 or Test Methods D 1557, or other, with description.

10.1.2 Condition of sample (unsoaked or soaked).

10.1.3 Dry density (unit weight) of sample before soaking, kg/m³ (lb/ft³).

10.1.4 Dry density (unit weight) of sample after soaking, kg/m³ (lb/ft³).

10.1.5 Moisture content of sample in percent:

10.1.5.1 Before compaction.

10.1.5.2 After compaction.

10.1.5.3 Top 1-in (25.4-mm) layer after soaking.

10.1.5.4 Average after soaking.

10.1.6 Swell (percentage of initial height).

10.1.7 Bearing ratio of sample (unsoaked or soaked), percent.

10.1.8 Surcharge amount.

10.1.9 Any special sample preparation and testing procedures (for example: for self cementing materials).

10.1.10 Sample identification (location, boring number, etc.).

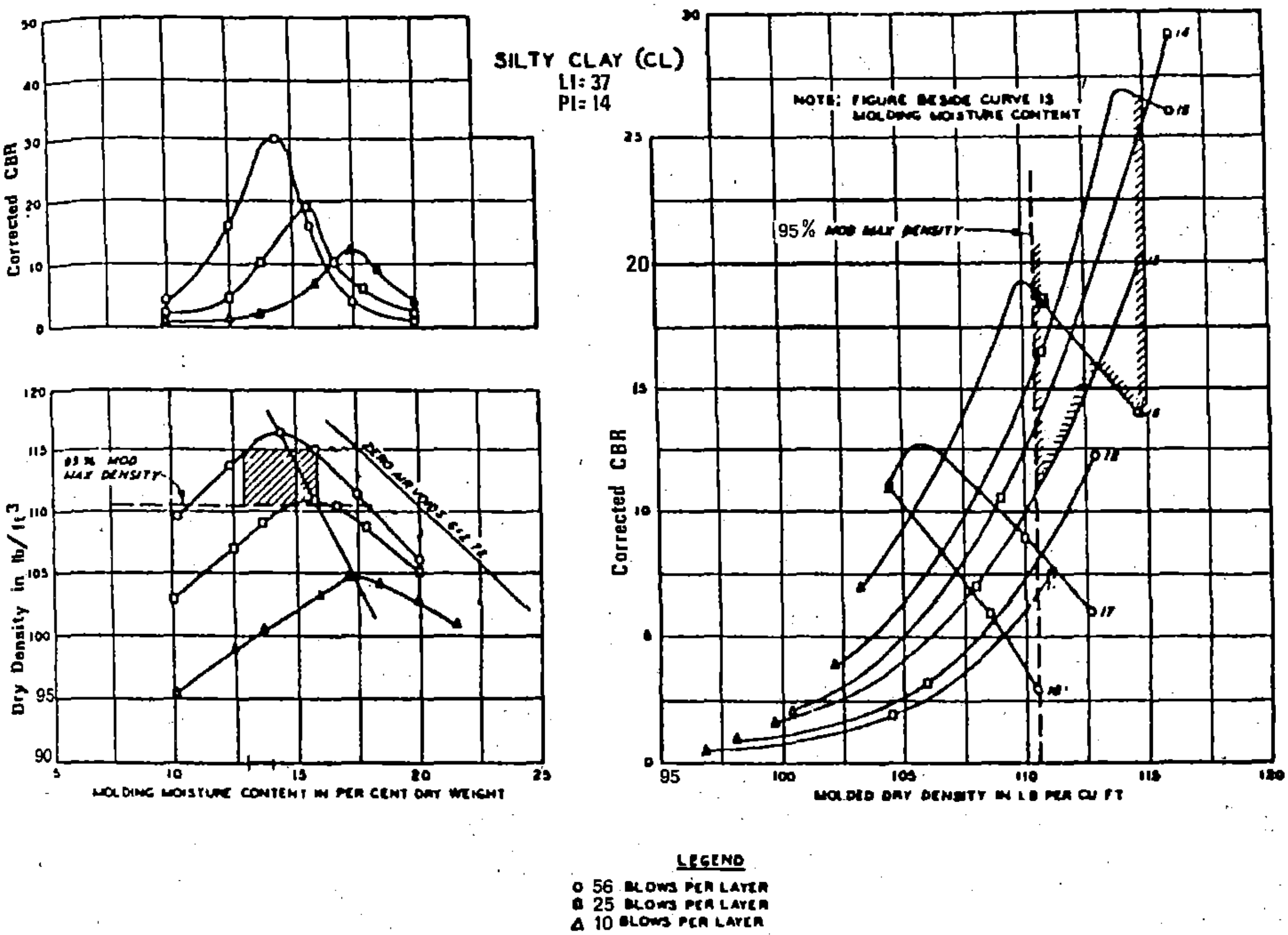
10.1.11 Any pertinent testing done to identify the sample such as: soil classifications per Test Method D 2487, visual classification per Practice D 2488, Atterberg limits per Test Method D 4318, gradation per Method D 422 etc.

10.1.12 The percent material retained on the ¾-in. (19-mm) sieve for those cases where scalping and replacement is used.

11. Precision and Bias

11.1 Bias statements are not applicable to this test method.

11.2 At present, sufficient data for determining the precision of this test method has not been gathered. Users are encouraged to submit data to the subcommittee for inclusion in the statement. One user, based on seven repetitions, has developed a IS % of 8.2 % (compacted per Test Method D 698) and 5.9 % (compacted per Test Methods D 1557). See Appendix X1 for the data used.



NOTE—Surcharge = 50 lb soaking and penetration. All samples soaked top and bottom four days. All samples compacted in 5 layers, 10-lb hammer, 18-in. drop in CBR mold.

FIG. 5 Determining CBR for Water Content Range and Minimum Dry Unit Weight

12. Index Words

12.1 This standard is indexed under the following terms:

California Bearing Ratio	Used For, Narrower Term
Pavement Subgrade	Used For, Narrower Term
Subgrade	Related Term, Broader Term
Pavement Subbase	Used For, Narrower Term
Subbase	Used For, Broader Term
Pavement Base Course	Used For, Narrower Term
Base Course	Used For, Broader Term
Strength of Soil	Used For
Pavement Design	Used For, Narrower Term
Acceptance Tests	Used For
Bearing Capacity	Used For
Materials Evaluations	Used For
Bearing Ratio	Used For, Broader Term
Load Penetration Curve	Used For
Design	Used For, Broader Term
Earthfill	Related To
Cohesive Soils	Used For
Compressive Strength	Used For
Flexible Pavements	Used For
Foundation Investigations	Used For
Soil Tests	Used For

APPENDIX

(Nonmandatory Information)

X1. Compactive Effort

```
  STANDARD (D698)                            MODIFIED (D1557)
        CBR                                        CBR
                              2                                          2
   (x)       (x-x)       (x-x)             (x)        (x-x)         (x-x)

  16.7         .5          ,25             77.0        3              9
  15.7        1.5         2.25             70.2        3.8           14.44
  18.2        1.0         1                80.8        6.8           46.24
  18.2        1.0         1                68.2        5.8           33.64
  18.8        1.6         2.56             76.7        2.7            7.29
  19.3        2.1         4.41             71.7        2.3            5.29
  17.9        0.7          .49             73.3        0.7             .49
 -----       ----        -----             ----       ----          -----
                        2                                        2
 x =124.8         (x-x) 11.96           x =517.9            (x-x)    116.39
 x = 17.2                               x = 74.0

         S = 11.96                            S = 116.39 =    19.39
             -----                                ------
               6                                    6

       IS (one sigma) = 1.41               IS =   4.4

     1S % =  1.41 X 100 = 8.2%          IS % = 4.4 x 100 = 5.9%
             ----                              ---
             17.2                              74

     D2S % = 22.6%                      D2S % = 16.7%

NOTES:
 - All Material passed the #10 sieve
 - Over 90% of all material passed the #40 sieve
 - Method A of AASHTO T99 & T180 used
 - Unit  weights were 110 PCF  ±  (D698) and 122 PCF  ±  (D1557)
 - 7 test repetitions
 - The above data is from one user
 - The (IS) and (D2S) limits represent the limits as described in
   ASTM Practice C670.
```

FIG. X1.1 Compactive Effort

2(b)
3

PARSONS ENGINEERING SCIENCE, INC.
19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

TO: Keith Houseknecht
LOCATION: Canton Drop Forge
RAPIDFAX NO.: 330·477·2046
COPIES TO:

FROM: Alan Resnik
LOCATION: Parsons ES
DATE: 2·3·98

TOTAL NUMBER OF PAGES 1 (including this cover letter)

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL BACK AS SOON AS POSSIBLE. TELEPHONE NUMBER (216) 486-9005.

PARSONS ENGINEERING SCIENCE, INC.
CLEVELAND, OH 44119 - RAPIDFAX (216) 486-6119

Keith,

Looking forward to seeing you on weds. at 9:00. The material I need to review, as available, is as follows:

Information related to the ongoing generation and disposal of wastes, regular and episodic. Specifically, I will need to see disposal receipts/manifests, waste characterization analytical results. I will also hope to review site operations and resultant waste streams. MSDS for products used will also be helpful. See you tomorrow and thanks for your assistance - Alan

JOB NUMBER 732961

02000C01

PARSONS ENGINEERING SCIENCE, INC.
19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

DATE: 20 January 1998

TO: Mr. Keith Houseknecht
LOCATION: Canton Drop Forge, Inc.
RAPIDFAX NO.: 330/477-2046
COPIES TO:

FROM: Ed Karkalik

TOTAL NUMBER OF PAGES 12 (including this cover letter)

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL BACK AS SOON AS POSSIBLE.

We are herewith transmitting the following:

DATE	NO.	DESCRIPTION
20/01/98		Completion of Lagoon No. 1 Reconstruction Project ... (3p)
20/01/98		Forensic Review and Analysis - Upper Clay Layer ... (5p)
14/01/98		Forensic Review and Analysis - Pump ... (2p)
19/01/98		Beaver's letter addressing pump installation changes (1p)

Keith -

Pls. refer to attachments regarding our analyses and recommendations for addressing the pump and upper clay layer issues at Lagoon No. 1.

With respect to the pump suction revamp, these cost appear to be reasonable. For the original changes, the majority are related to materials (2 tees, two valves, one check valve, 4 flanges, extra pipe). For the new changes, these are primarily related to labor costs (2 welders for one day plus equipment & supplies).

Final disposition of the clay layer issue will not be known until the proposed testing and analyses are completed (see items #1 and #6 in "Proposed Course of Action" Section.

Pls call, when you have had a chance to read the attached materials, to discuss future actions.

JOB NO. 731397.03000

02000002

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3

PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119
PARESCL/0198Dcc/EJK7-40

20 January 1998

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Completion of Lagoon No. 1 Reconstruction Project - Budgetary Status

Dear Keith:

As I indicated to you on 6 January 1998, Parsons ES' budget for providing project management, construction supervision, and VAP review services regarding the referenced project was exhausted as of the week ending 2 January 1998. The current status (as of 16 January 1998) is as follows. In terms of labor hours, Parsons Engineering Science, Inc. (Parsons ES) had proposed (see our letter proposal dated 12 November 1997), a level-of-effort (LOE) estimate of 40 hours of observation time. As indicated in our proposal, this was based on Beaver's estimate that, if acceptable weather conditions were experienced, about 7 days of construction activity, spanning between 15 November 1997 and 15 December 1997 (and assuming a 15 November 1997 notice to proceed), would be required to complete the project.

Due to a number of unforeseen and unbudgeted factors, substantial and operational completion of Lagoon No. 1 required more time - on the calendar and in terms of labor spent - than planned. Start-up was not attempted until 6 January 1998 and was not completed until 8 January 1998, with the assistance of Argo Technologies, Inc., the pump vendor. In particular, as of 16 January 1998, the following effort had been spent on construction observation, and related activities, by Messrs. Sam Saad and Ed Karkalik:

- Lagoon No. 1 construction observation — 54 hours (vs. 40 hours budgeted)
- ODOT sewer project planning — 8 hours (vs. 0 hours budgeted)
- Lagoon No. 1 post-start-up trouble-shooting — 10 hours (vs. 0 hours budgeted)

As of 16 January 1998, Parsons ES' Canton Drop Forge project is 29 hours over budget, including $2,608 for labor and $230 for other direct costs (ODCs), specifically for mileage ($163), Stark County Recorder's fees ($15), parking at Stark County Recorder's office ($3), and telephone/facsimile expenses ($49), totaling $2,838 in incremental expenses incurred to-date. Of these incremental expenses, about 50% are related to the original scope of work and fit within the increased LOE budget projected in Parsons ES' proposal dated 12 November 1997 (i.e., an additional $1,509). Other expenses (about 25%) are related to the ODOT sewer project planning meetings, conducted on 31 December 1997 and 9 January 1998 and a side-trip to the Stark County Recorder's office (to research deeds) during 6 January 1998. The remaining (approximately 25% of these) expenses are related to trouble-shooting activities undertaken to-date to place Lagoon No. 1 into service.

At this point, Parsons ES requests authorization (for immediate release), for the incremental expenses related to additional construction observation and ODOT sewer project planning activities, of $2,128 (i.e., about 75% of the total incremental expenses) incurred to-date. Parsons ES also requests that CDF authorize an additional $6,500, ***to be held in reserve*** (pending the outcome of post-start-up investigations and remedies; see below), to cover incremental costs expected to be incurred by Parsons ES through the completion of the post-start-up phase (see Table 1). These reserve funds include about $2,100 in other direct costs (ODCs) proposed for the geotechnical sampling, testing, and analyses (described in the referenced report concerning the clay layer) as well as $710 already spent to-date for resolving these issues.

As indicated in the attached reports (one each pertaining to the pump and upper clay layer installations), there appear to be several possible causes for the problems observed. Parsons ES believes that completing the investigations, analyses, remedies and closure of these two issues is of primary importance. It is further believed that information regarding their root causes will be discovered as a result of these efforts to rectify the situations noted.

As always, Parsons ES appreciates the opportunity to work with Canton Drop Forge in the fulfillment of CDF's environmental requirements. We appreciate your patience while we work with Argo Technologies, Inc., The Beaver Excavating Company, and Beaver's many suppliers and subcontractors to resolve these two situations. We share CDF's desire for the timely and successful completion of the Lagoon No. 1 reconstruction project and remain committed to resolving these issues to your satisfaction.

Most sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Wilson H. Rownd, PE
Vice President/Manager

Edward J. Karkalik, PE
Project Manager

WHR/EJK/dee
cc: Mr. Jerry Bressanelli - President, Canton Drop Forge, Inc.
CMB (File 731397.03000)

TABLE 1

CANTON DROP FORGE, INC.
PROPOSED COST ESTIMATE
FOR ADDITIONAL ENGINEERING SUPPORT
TO ADDRESS PUNCH LIST ITEMS
FOR
LAGOON NO. 1 RECONSTRUCTION PROJECT

TASK DESCRIPTION	LABOR HOURS	LABOR COSTS	ODCS COSTS	TOTAL COSTS
Work Already Completed	8	$652	$58	$710
Suction Line Changes - observation	5	$316	$58	$374
Sample/Test Upper Clay Layer	8	$744	$1,363	$2,107
Modify Drainage & Infiltration Pathways into Lagoon - swale - French drain - evaluate drain lines - seal penetrations	9	$520	$116	$636
Re-stabilize Upper Clay Layer - treatability testing - admixing - compacting - closure	24	$1,624	$1,052	$2,676
TOTALS	54	$3,856	$2,647	$6,503

FORENSIC REVIEW AND ANALYSIS
UPPER CLAY LAYER INSTALLATION
FOR THE LAGOON NO. 1 RECONSTRUCTION PROJECT
CANTON DROP FORGE, INC.

OBSERVATIONS

On Thursday, 8 January 1998, while addressing the pump issues associated with this project, Mr. Sam Saad, Parsons Engineering Science's (Parsons ES') construction observer for the entitled project at Canton Drop Forge, Inc. (CDF), observed what appeared to be a slump in the upper clay layer of the installation. The slump was about 25 feet across at its base and about 15 feet high along its vertical centerline. The slump area is just to the left of a newly installed inlet line (for discharging storm water collected in a catch basin to the southeast of Lagoon No. 1) and seemed to start at the then current waterline of the lagoon. On Friday, 9 January 1998, Messrs. Keith Houseknecht of CDF and Ed Karkalik of Parsons ES inspected the lagoon and observed essentially the same conditions. About three other, much smaller slump areas were also observed; two in the southwest corner of the pond and one directly below the suction line. All of these seemed to form just at or above the waterline and were no more than about two feet across. Further investigation indicated that pools of standing water were observed on the bank above the lagoon at these locations and/or that other penetrations through the clay layer may have occurred at these locations. Also, at the location of the big slump, water entering the lagoon from the newly installed storm water inlet appeared to have eroded through the upper clay layer by spreading beyond the areas of the rip-rap, which had been installed directly below the inlet pipe for erosion control. In response to Parsons ES' request, The Beaver Excavating Company (Beaver) installed an extension, as a temporary measure, on the subject inlet line, bringing it to within a few feet of the waterline and, thus, eliminating the potential for further erosion of this area.

On Monday, 12 January 1998, Messrs. Houseknecht of CDF and Saad, Karkalik and Keith Rankin of Parsons ES investigated the lagoon in more detail. Conditions were essentially the same as observed in the previous two trips. The big slump appeared to have completed its slide and reached equilibrium. Also, Beaver had attempted to re-grade the top bank of the lagoon, eliminating or greatly reducing the pools of water collecting around the top edge and reducing the likelihood of surface infiltration into the lagoon. Several additional details were observed by Keith and Sam:

1. the fill material which had been installed just below the upper clay layer was extremely hard (compacted), but not scarified as required. In fact, at first, we thought that the material appeared frozen but, on further analysis, the exposed material proved to have frost to only a very shallow depth.

1-26 POOL STILL ABOVE MAJOR SLIDE

2. the pools were gone, but evidence of their presence could still be seen, future precipitation will likely collect in the same areas and likewise drain into the lagoon. Keith

Rankin suggested that a "French drain" system and finish grading of the top of the lagoon bank be completed at the earliest possible opportunity to channel water away from the lagoon. Gradients at the top of the lagoon bank are very shallow; consequently, precipitation collects here, infiltrates the granular material and eventually finds a pathway into the lagoon. Keith Houseknecht recalled observing water infiltrating into the lagoon during pre-construction times, due to these reasons. OVER THE BANK IS NOT INFILTRATING GRANULAR MATL

3. it appeared that water may have infiltrated into the subsurface layer (i.e., below the upper clay layer) around the pump pad, pipe supports for the suction line and the newly installed storm water drain line. We were uncertain as to the details of construction of these structures; in particular, how the upper clay layer was penetrated (and subsequently sealed). Sam suggested that we ascertain whether pea gravel or some other form of course aggregate was placed, around the previously described storm water drain line, as back-fill when the drain was installed.

4. the water level (since Friday, 9 January 1998) had raised to a new high waterline level and then subsequently been pumped down a foot, exposing a high waterline all around the pond. This was not deeper than perhaps one-quarter to one-half inch, but was a clear demarcation. ~ w/ STEP IN CLAY = 1/4"

5. by probing the slumped clay material at and below the waterline in and adjacent to the slump areas, Sam and Keith Rankin observed that the material was soft (i.e., without significant compressive strength). There was no similar attempt made in non-slumped areas. Slumped material above the waterline apparently had enough compressive strength to support the observers weight. In previous observations, the slumped material above the waterline offered no compressive strength, but rather reacted and looked like wet oatmeal (in consistency, color and strength).

BACKGROUND

In July 1997, Parsons ES, under contract to CDF, developed a bid package, including general and detailed specifications and design drawings, for the Lagoon No. 1 reconstruction project. Included in the package were specifications for the clay material to be used for the upper and lower clay layers of the project. The selected contractor (Beaver) was designated responsible for completing all material and field testing to ensure compliance with the design and specifications (Section 00700-12; 23.0). Specifically, clay material was specified to consist of soil classified as GC, SC, CL or CH with a maximum re-molded permeability of 1×10^{-5} cm/sec (Section 02200-4; 2.05). Compaction of each layer is required to achieve a minimum 90% compaction (according to ASTM D1557); also each layer must be scarified to a depth of 2 inches prior to placement of any overlying lifts of clay (Section 02200-5; 3.05 and 3.06). The specifications do not mention any other criteria or testing requirements. Subsequent review of testing undertaken and results obtained by Beaver has indicated that, except for a determination of soil classification, all specified analyses had been performed. BUT NOT SCARIFIED ?

NOT APPLICABLE PER PAGE 3

BEFORE BIDS

In October 1997, when it became apparent that importation of additional fill material was going to be required to achieve the required 2:1 slope ratio (2 feet horizontal to 1 foot vertical), the issue of side slope stability was re-addressed. Originally, in its bid, Beaver had planned to cut material from the top of the banks to fill the bottom and thus reach the required slope. CDF indicated that this was unacceptable. Doing so would eliminate access around the south and west sides of the lagoon. Thus, a substantial change in scope was required. At this time, the slope stability issue was re-introduced and, based on information from Parsons' geotechnical engineers in Cincinnati, we recommended to CDF that the side slope ratio be reduced to a maximum of 3:1. See letters dated 25 September, 5 November and 12 November 1997. After considerable debate, CDF approved changing the side slopes to 2.5:1, instead of the 3:1 recommended in our revised design. Also, testing of the structural strength of the clay, as recommended by our geotechnical engineers, was proposed but not deemed necessary or approved. Apparently, due to the amount of work, which had been completed with the clay material, there was a degree of comfort on the parts of Beaver (and subsequently CDF). Parsons ES, working with Beaver, then revised the lagoon design to accommodate the 2.5 to 1 side slope ratio and CDF issued PO's to Beaver and Parsons ES to complete (and observe, respectively) the work by 15 December 1997, weather permitting. The weather did cooperate, for the most part, and the upper clay layer was placed by 26 December 1997.

NOT CDF PROBLEM

NO RECOMMEND WAS 2:1 TO 3:1 CDF CHOSE 2.5:1

BEAVER HAD IT AT 1:1

By Who

?

?

It should be noted that, since the upper clay layer is nominally six inches thick, standard nuclear density testing (in accordance with ASTM D1557) cannot be performed. As a result, we are not certain that the required level of compaction was achieved.

FORENSIC ANALYSIS

Through consultation with our geotechnical engineers, Parsons ES has identified several possible root causes of the slumping or slip failure of the upper clay layer in Lagoon No. 1 at CDF. These include (based on the information available at the time that this analysis was performed, in the order of likelihood) the following possibilities. Please note that this analysis cannot be confirmed until the testing, proposed in the next section, has been completed.

A. Water entering the more porous intermediate fill layer (or at the interface between the fill and upper clay layers), due to infiltration of surface water observed pooling near the top rim of the lagoon, could have traveled down the slope below the upper clay layer and built up sufficient head through accumulation, saturated the clay layer from the underside (while the top-side was exposed to and saturated by storm water accumulating in the lagoon) and forced its way from this pocket, creating the slip area. This theory may be confirmed by the presence of similar, but much smaller slip areas elsewhere in the lagoon, near other penetrations through the upper clay layer.

B. Another possibility is the general instability of the upper clay layer, at a slope of 2.5 to 1, when exposed to saturated conditions.

C. A third possibility is the observance of small areas of instability in the upper clay layer, caused by the presence of localized placements of off-spec clay (i.e., clay with extraordinarily high concentrations of silt or gravel).

Until the testing and analyses recommended below are completed, it will be difficult to speculate further with respect to the most likely (and/or contributing) cause(s) of the observed slippage conditions.

PROPOSED COURSE OF ACTION

Parsons ES, on the advice of our geotechnical engineers, recommends that the following steps be taken to assess the probability and prevent future slippage of the upper clay layer and correct problems noted to-date:

1. Research the geotechnical properties of the material (e.g., Buckeye Mines) used for the upper clay layer. Conduct penetrometer and/or vane shear testing of the upper clay layer in several, discrete locations. Collect samples from the upper clay layer, from both below (saturated) and above (unsaturated) the waterline, for analysis of grain size (in accordance with ASTM Standard D422), water content (D2216) and plasticity (D4318), providing soil classification information. Also, determine unconsolidated, undrained shear strength (D2850);

2. Re-grade and compact the top of the bank of the lagoon by creating a swale at least 10 feet from the lagoon's edge, to ensure that water will drain away from the lagoon;

3. Due to the limited slope available in the swale proposed in item #2 above, install a "French drain" system to collect and convey the surface water towards the catch basin in the parking area southeast of the lagoon;

4. Evaluate, excavate and replace, if appropriate (i.e., if the material is course, porous stone), the back-fill placed around the drain line installed between the new catch basin (near the southeast corner of the lagoon) and the lagoon with clay to prevent surface water infiltration under the upper clay layer;

5. Seal and compact the areas around the pump pad, pipe supports and any other penetrations through the upper clay layer to prevent surface water intrusion;

6. Depending on the results of the compressive shear strength testing conducted in item #1 above and treatability testing conducted by modifying the shear strength through the introduction of varying ratios of suitable admixtures (i.e., cement kiln dust or Portland cement), improve the structural stability of the upper clay layer by adding such admixtures to the layer, disking the admixtures into the clay and compacting it; and

7. Test the compaction of the upper clay layer using a modified version of field density testing procedure (i.e., ASTM D1557, modified for depth, or pocket penetrometer); re-compact and re-test, as necessary, until 90% Proctor is achieved throughout.

CAN NOT — IF CAN WHY NOT BEFORE

It is believed that the procedures described above will resolve the upper clay layer slippage situation and reduce the probability of future surface water erosion of the layer.. Costs for the testing recommended in Item #1 are estimated to be in the range from $1,750 to $2,250, if performed by a local geotechnical testing company (e.g., PSI).

Respectfully submitted,

Ed Karkalik

Edward Karkalik

Sam Saad

Sam Saad

reviewed by Keith Rankin / EJe

Keith Rankin

20 January 1998

cc: File 73139703000
Mr. Keith Houseknecht, Canton Drop Forge, Inc.

CDF007035

TRIP REPORT
FORENSIC REVIEW AND ANALYSIS
PUMP DESIGN, SELECTION AND INSTALLATION
FOR THE LAGOON NO. 1 RECONSTRUCTION PROJECT
CANTON DROP FORGE, INC.

On Tuesday, 6 January 1998, representatives from Canton Drop Forge, Inc. (CDF), The Beaver Excavating Company (Beaver) and Parsons Engineering Science, Inc. (Parsons ES) participated in an exercise to start-up and commission the Lagoon No. 1 pumping system at CDF. After numerous attempts, which incorporated varying permutations of value settings, the effort was abandoned. Apparently, the pump could not self-prime from a dry suction start, as designed. Several reasons were suspected but no pronouncement could be made until a Gorman-Rupp (G-R) representative analyzed the situation.

On Thursday, 8 January 1998, Messrs. Gary Haverny of Argo Technologies, Inc. (Argo), the sales representative who originally identified the pump and provided conceptual design details (i.e., in particular, with respect to the elevations and configuration of the pump suction line), Sam Saad of Parsons ES and Keith Houseknecht of CDF inspected and analyzed the situation. In addition to a visual inspection, Gary performed tachometer and vacuum tests of the pump's rotating speed and suction performance. As a result of the vacuum testing, leaks were identified in the bypass value installed on the suction side of the pump. Apparently, minor amounts of air were leaking both through the valve's seat and packing. After these were tightened, the pump's performance improved and the pump self-primed. Vacuum readings had improved from 10 to about 16 feet of water; the elevation difference between the suction inlet and the pump is 13.12 feet. TAKES 15 MINUTES

Gary also identified two potential problems with the suction line design and installation. In particular, the suction line bypass valve is oriented in a vertical, rather than horizontal position, thereby trapping air. Also, the horizontal section of the suction line immediately preceding the pump inlet exceeds manufacturer's guidelines for such sections: G-R recommends that horizontal section be no longer than 10 pipe diameters (nominally, 40 inches). The original, approved design showed a horizontal length of less than 40 inches (actually about 36 inches in length). This feature of the design was changed in the field when the pump pad was relocated back into the bank of the lagoon by about 5 feet. This change was necessitated by a change in field conditions; when the excavation for the pump pad foundation was dug in the original location, unsuitable fill was encountered. Rather than continue digging, a decision was made in the field to re-locate the pad, thus increasing the horizontal run by a corresponding length.

Due to scheduling conflicts (also the fact this activity had not been identified as a critical event in our proposal to CDF), Parsons ES' construction observer was not present during this installation. Apparently, the decision to relocate the pad was made by Beaver and

Beaver's subcontractors. CDF and Parsons ES were informed after the change had been made. Unfortunately, the subsequent change in design of the piping was not considered. Beaver's contract for this work is directly with CDF.

Prior to start of pump installation, Parsons ES had provided to Beaver a revised location drawing, a drawing showing general elevation arrangements and a detailed schematic showing the general arrangement of piping, pump and valves. These were then interpreted in the field by Beaver's subcontractor doing the piping installation.

On 8-9 January 1998, Parsons ES contacted G-R in Mansfield and confirmed the changes in suction piping required to improve the pump's performance to the original design's potential. This required rotation of the bypass valve on the suction line by 90 degrees (i.e., to a horizontal rather than vertical position) and the reduction of the horizontal piping length to about 40 inches or less; this later change involves the angling of the suction line from a point just beyond (looking from the pump's suction) the bypass valve to a point several feet down-slope from the existing angle in this run (refer to sketch). This information has been sent to Beaver with a request for a price quote for the change.

Ed Karkalik
Project Manager

Sam Saad
Construction Observer

14 January 1998

cc: File 73139703000
Keith Houseknecht, CDF

2(b)
3 EJK

BEAVER EXCAVATING COMPANY

THE BEAVER EXCAVATING COMPANY

January 19, 1998

Parsons Engineering Science
19101 Villaview Road – Suite 301
Cleveland, Ohio 44119

Attention: Ed Karkalik

Reference: Canton Drop Forge
Lagoon #1 Reconstruction
Our Job #2693

Gentlemen:

Per your request we propose the following:

1.) Original changes (December sketch)
 a.) Extend suction line farther into lagoon.
 b.) Install 3" tee & flanged two (2) places.
 c.) Install 3" flanged check valve in discharge line.

FOR THE SUM OF $1,008.00

2.) Revamp pump suction line & rotate valve 90° per latest drawing (1-15-98).

FOR THE SUM OF ....$ 965.00

If you have any questions please feel free to contact our office.

Thank You,
BEAVER EXCAVATING CO.

Stanley R. Evans
Senior Project Manager

SRE/lf

2(b)
3

PARSONS ENGINEERING SCIENCE, INC.

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216)486-9005 • Fax:(216)486-6119

DATE: 20 January 1998

TO: Mr. Keith Houseknecht

LOCATION: Canton Drop Forge, Inc.

RAPIDFAX NO.: 330/ 477-2046

COPIES TO:

FROM: Ed Karkalik

TOTAL NUMBER OF PAGES 12 (including this cover letter)

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With respect to the pump suction revamp, these cost appear to be reasonable. For the original changes, the majority are related to materials (2 tees, two valves, one check valve, 4 flanges, extra pipe). For the new changes, these are primarily related to labor costs (2 welders for one day plus equipment & supplies).

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Pls call, when you have had a chance to read the attached materials, to discuss future actions.

JOB NO. 731397.03000

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CDF007039

PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC

19101 Villaview Road, Suite 301 • Cleveland, Ohio 44119 • (216) 486-9005 • Fax (216) 486-6119

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PARESCL/0198Dec/EJK7-40

20 January 1998

Mr. Keith Houseknecht
CANTON DROP FORGE, INC.
4575 Southway Street, SW
Canton, Ohio 44706

Reference: Completion of Lagoon No. 1 Reconstruction Project - Budgetary Status

Dear Keith:

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Most sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Wilson H. Rownd, PE
Vice President/Manager

Edward J. Karkalik, PE
Project Manager

WHR/EJK/dee
cc: Mr. Jerry Bressanelli - President, Canton Drop Forge, Inc.
CMB (File 731397.03000)